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Part IV

Federal Communications Commission

Table of Television Channel Allotments

FEDERAL COMMUNICATIONS COMMISSION

47 CFR Parts 1, 73

[BC Docket No. 80-499; FCC 80-545]

Table of Television Channel Allotments

AGENCY: Federal Communications Commission.

ACTION: Notice of proposed rulemaking.

SUMMARY: Commission proposes rule changes to permit new VHF television allotments at less than the specified minimum mileage separation distances, provided the new stations antenna height and power are reduced to provide equivalent protection to existing stations. These proposed changes result from the Commission's desire to utilize the radio spectrum more efficiently and satisfy the demand for additional television outlets. The proposed rule changes should create opportunities for a significant number of new VHF television allotments throughout the country.

DATES: Comments must be received on or before December 15, 1980 and Reply Comments must be received on or before February 15, 1981.

ADDRESS: Federal Communications Commission Washington, D.C. 20554.

FOR FURTHER INFORMATION CONTACT: Benjamin Perez, Federal Communications Commission, Broadcast Bureau, Washington, D.C. 20554 Phone: (202) 632-3861.

In re: Table of Television Channel Allotments, BC Docket: No. 80-499.

Adopted: September 18, 1980.

Released: October 21, 1980.

By the Commission: Chairman Ferris issuing a separate statement; Commissioners Lee, Quello and Washburn dissenting and issuing statments.

I. Introduction

1. The Commission has before it today a *Notice of Proposed Rule Making* that would modify the process for making available additional Very High Frequency (VHF) television allotments.[1] The primary impetus for these modifications is that, taken together, they will provide the potential for a substantial amount of new television service. There are a number of significant benefits to this potential, if realized. Among them are: Meeting an increased viewer demand for additional television service; providing increased program and ownership diversity of television stations; as well as enhancing competition. Thus, the basic public interest issue that must be addressed in this proceeding is whether the benefits of added service, diversity of programming and ownership, and competition that would ensue from increasing the number of VHF television outlets outweigh claims of potential harm of VHF television from greater UHF competition and to VHF television viewers from the prospect of some increase in interference. On balance, at this time, we believe that the scales tip in favor of the proposed rule changes.

2. The modifications that we are today proposing in the current process for adding VHF television allotments are incremental, building on existing technical and other policies and on legal precedent. The proposed changes themselves do not constitute a significant departure from existing practice. It is only in the context of the potential for additional new television service created by these changes that they assume significance. There are three basic areas on which the proposals in this notice focus: technical considerations, utilizing criteria already adopted by the Commission for similar purposes, that minimize the potential for an increase in interference to existing VHF television viewers; changes in the way in which the competitive impact on UHF television service is considered; and, procedural changes in the way in which additions of VHF television allotments are made to the Table of Assignments (which we propose to rename the Table of Television Channel Allotments, hereinafter "Table").

3. Basically, the proposed technical rule changes are ones that would allow additions to the Table wherever sought, provided any proposed station situated at less than the minimum standard distance specified in our Rules reduced its power radiated in the direction of any existing station by an amount commensurate with the reduction in distance. The particular method of formulation that relates power to distance is called "equivalent protection," and was first considered by the Commission in the initial stages of its regulation of broadcast television. Equivalent protection has been used numerous times since then in move-in proceedings,[2] and is discussed in greater detail at paragraphs 97-100, *infra*.

4. Although employing established technical methods, the proposed rules do represent a procedural change in the manner in which allotments are added to the Table. In particular, the net public interest benefits from the new service potential offered by a new allotment at less than full mileage separation initially would be presumed to be controlling; the burden of proof to show otherwise would fall on the opponent to the new allotment. Under current rules, the petitioner for the new allotment has the burden of showing, in a waiver context where the burden of proof is always heavy, that a short-spaced allotment is in the public interest. The current procedure for additional short-spaced VHF facilities requires the proponent to submit lengthy and expensive analyses of engineering and population surveys before an allotment can even be made. These analyses are then hotly contested. This procedure creates barriers to entry, discouraging rather than inviting those seeking to provide new service, particularly minorities and others with little representation in the current broadcast television industry. By incorporating the tradeoff between power and distance into a rule to which petitioners for new allotments must adhere, it is possible to dispense with the waiver procedure while at the same time assure interference levels that are consistent with the public interest.

5. Under the new proposal, if the required formula is met, the proposed allotment is presumed to be in the public interest. Opponents, however, can introduce at the allotment rulemaking

[1] The Commission has referred to the process of designating a particular television channel to a particular city or area as the "assignment" of the channel. In a separate proceeding involving all interested potential licensees, the station license is "assigned" to a particular individual or group, to the exclusion of other applicants. This dual use of the term "assignment" has led to some confusion. *See e.g., Sangamon Valley Television Corp.*, 269 F. 2d 221 (1959).

At the 1979 World Administration Radio Conference (WARC), new definitions were added (in Article N 7/5) to the International Radio Regulations. These new definitions, which are consistent with the internationally accepted terminology found in Resolution No. 6 of the 1959 WARC, provided specific terminology for distribution of radio frequencies to specific areas within a country ("allotment"), and the designation of a particular station to use that frequency or channel ("assignment").

Consistent with that adoption of international terminology (which will be binding on the United States if the United States Senate ratifies Article N 7/5 of the 1979 WARC final resolutions) and consistent with the change of direction the rules we are proposing today will herald, we propose, upon final adoption of today's proposed rules, to change the terminology used in Part 73 of the rules to conform to the WARC 1979 terminology. Accordingly, § 73.606, Table of Assignments, would be amended to be called "Table of Television Channel Allotments," and all other terminology in our Rules would be changed to conform appropriately.

[2] In fact, the underlying technical considerations and planning factors are derived from the *Third Notice of Proposed Rule Making*, in Dockets Nos. 8736, 8975, 9175, 16 FR 3072 (March 21, 1951). In 1961 the Commission adopted the concept of equivalent protection and the formulation we are proposing today for use in future consideration of short spaced allotments. *Supplement to Report and Order* in Docket No. 13340, 21 R.R. 1709 (1961). *See* paragraphs 33-36, *infra*.

stage evidence that they believe shows why the addition of the new allotment is not in the public interest. In so doing, any opposing party would have a heavy burden of proof in showing that a grant would not be in the public interest. The Commission would deny only those contested rulemaking petitions where it was shown that a grant would result in a net loss of service to the public. The proposed procedure is set forth in detail. *See* Section VI, *infra.*

6. In the past, as explained Section IV, *infra,* our concern for the impact of additional VHF allotments or increased VHF facilities on existing or potential UHF service has been an important factor in determining whether to authorize additional VHF service.[3] We were concerned that additional VHF service might so damage the UHF television service that over a period of time the viewing public would end up having fewer total signals available. For this reason, we have carefully scrutinized the current viability of the UHF television service and considered its ability to continue to provide service to the American public in the future.[4] We have concluded that the potential negative impact on UHF is limited and far outweighed by the benefits to the public from additional VHF service. We propose, therefore, that existing precedent, established in *WFMY Television Corp.* (hereinafter, *WFMY*), 59 F.C.C. 2d 1010 (1976),[5] be extended. Since *WFMY,* The impact of new or changed VHF service on unused UHF allocations can only be considered if opponents show that there will be an applicant for the unused UHF channel within two to three years. We are now proposing that the potential effect of the proposed new VHF service on *unused* UHF allocations not be considered in allotment rulemakings. Opposition to new VHF service based on allegations of harm to *existing* UHF stations will continue to be allowed at the allocation rulemaking stage. Unlike the current approach, however, it is proposed that the opposition to the new VHF service should have the burden of proving that the alleged adverse impact outweighs the strong public interest in additional television service.

7. The Commission's decision last week to add short-spaced VHF allotments in four cities [6] represented the first application of the *WFMY* policy to a VHF drop-in. Based on the same technical criteria that underlie the proposals before us today, a strong public interest justification was made for the four allotments. Events in the rulemaking on those cities, however, illustrates a major weakness of current policy that today's proposal could remedy. The existing market-by-market waiver procedure proved costly and lengthy. It took over six years and a tremendous investment of resources to reach the point of concluding the proceeding. The proposed rule changes before us today would alleviate the situation where petitioners expend huge sums fo money on allotment proceedings with no assurance that they will be the party ultimately granted a license.

8. In addition to promoting diversity, these proposed measures should increase the efficiency of the use made of that portion of the spectrum set aside for broadcast television, in accordance with the mandate of Section 303(g) of the 1934 Act. In a time when the demands on spectrum use are rapidly growing, the Commission must review all of its policies with spectrum conservation in mind. In this regard, we are also proposing rule modifications that will have additional spectrum saving benefits. For example, the joint implementation of precise offset or synchronous carrier technology by short-spaced stations will reduce co-channel interference, thus expanding service to the public. In the past, the dropped-in station has borne the entire cost of installing this technology. Because efficient use of the spectrum is a responsibility that should be shared by all licensees, we propose that each station bear its own share of the costs of offset precise or sychronous carrier equipment and calibration.[7]

9. Finally, we recognize that our proposed approach could result in some degradation of the television signals received by some viewers. We believe, however, that any potential loss experienced will be more than offset by the benefits of such a policy—additional television service for the public. We also look to recent and future technological advances in television receivers and antenna systems and greater transmitter frequency stability to more than offset any decrease in the signal quality of those who view stations that are affected by the addition of more television stations as a result of this proceeding.[8] As we detail in paragraph 106, *infra,* the use of outdoor receiver antennas with reasonable front-to-back ratios and the introduction of precise frequency offset (paragraph 117, *infra*) can be used to compensate for any added interference, providing distant viewers of existing stations with a grade of service (i.e., picture quality) equivalent to what is provided by our rules in the absence of the new station's interfering signal.

10. In general, it is in the public interest for the Commission to promote opportunities for additional service to the American public. Increasing the number of television competitors is likely to (1) put pressure on competitors to be more responsive to the wants and needs of consumers, (2) increase the total amount of service available to comsumers, and (3) increase the diversity of service offered. The proposed rule changes, by providing the opportunity for additional VHF service, would give entrepreneurs greater flexibility in choosing the most effective means of delivering television service to the public. Because there is strong evidence of considerable unmet demand for both more television service and more diverse television service,[9] the proposed rule changes would provide substantial public benefits.

11. We are aware that proposals similar to those before us today have been made in the past and, on those occasions, have been rejected by the Commission. We believe, however, that changed conditions—especially the major improvements and penetration of the UHF television service, technological improvements in television transmission and reception

[3] *See Report and Order* in Docket No. 20418 allocating new VHF–TV channels for Knoxville, Tennessee; Johnson, Pennsylvania; Charleston, West Virginia; and Salt Lake City, Utah, adopted September 9, 1980.

[4] *See* Section V, *infra.*

[5] In *WFMY,* the Commission, recognizing "that UHF broadcasting had advanced it to the point where a much more 'substantial' impact can be tolerated without disservice, overall, to the total public interest," 59 F.C.C. 2d at 1017, held that regardless of the extent of impact on UHF, the VHF applicant would be allowed to show that overall the public interest would be advanced. Interested parties will continue to be allowed at the allotment rulemaking stage to demonstrate adverse impact on UHF stations. Unlike the current approach, however, it is proposed that the opposition to the new VHF service should have a heavy burden to prove that the UHF impact outweighs the strong public interest in additional television service.

[6] *Report and Order* in Docket No. 20418, —— FR —— (October —, 1980—).

[7] For a fuller discussion, *see* paragrpahs 112—116, *infra.*.

[8] As long as strict mileage separation rules are imposed, there are no incentives for equipment manufacturers to invest in research and development aimed at developing receivers with the improved performance characteristics needed in an intensively used spectrum environment. With the easing of these rules, such incentives are created. Note, for example, the development of more spectrally efficient mobile radio equipment as the frequency bands allocated to that service have become more crowded. Similary significant advances in the bandwith, selectivity and susceptability of present day television receivers have not taken place, although the technology necessary for this type of progress is already available. *See, e.g., Final Report for High Performance Television Receive,* D. L. Ash and C. S. Hartmann, Texas Instruments Inc., F.C.C./OCE 78–01 (March 1978).

[9] *See* paragraphs 12–20, *infra.*

that allow for better service in a congested environment, and continued growth in demand for television services—yield a situation in which the public benefits from the proposed rule changes now may outweigh the costs. Given that the proposed rule changes are evolutionary in nature but offer the potential for substantial new service to the public, we believe it is appropriate at this time to propose the changes.

II. Public Interest Benefits of Additional Television Service

12. To the fullest extent possible, opportunities to provide service should be made available whenever would-be broadcasters are willing to offer such service. That is, subject to appropriate technological constraints (i.e., limiting interference to acceptable levels), it is in the public interest to have a regulatory framework that permits the maximum number of signals that can be economically viable.[10] Only if the provision of a smaller amount of additional service to the public now would foreclose the possibility of a greater amount of service in the future should restrictions be placed on potential providers.[11]

13. There are two major public interest benefits from allowing, whenever technically feasible, all who want to broadcast to have access to the capacity to do so. The first is the increased benefits to viewers from filling an excess demand for service that is unmet today. The second is the first amendment gains from additional voices.[12]

14. For a number of years various students of television have pointed to the existence of a desire by viewers for more signals than the number they were receiving.[13] These studies have been extensively discussed and analyzed by the Commission in the *Cable Economic Inquiry* and by our staff in the Low Power Television Staff Report.[14] Those discussions need not be repeated here. There is, however, additional, if indirect, evidence that more stations could be economically viable than are currently on the air.

15. Because most television service is not directly purchased by consumers, it is difficult to get direct estimates of how much service consumers would be willing to support. An indirect indication of the demand for television service is the demand by entrepreneurs for broadcast and nonbroadcast systems of television service. It is useful to note the number of channel allotments that have already been licensed or applied for. Table 1 summarizes the use of television channels as of December 31, 1979. It is clear that the VHF-band is virtually saturated. There were no vacant commercial VHF Channels in the top 100 markets, and only 6 vacant, unapplied for commercial V's in the second 100 markets. A computer run on September 9, 1980 indicated that here were no allocated frequencies—UHF of VHF—available in the top 36 markets. Although the UHF band continues to have some vacancies in markets below the top 36, applications were pending for 72 new commerical UHF channel in the top 100 markets and 14 more in the second 100 markets. The non-commercial channels were virtually saturated in the VHF band, somewhat saturated for the top 100 markets in the UHF band.

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[10] Attempts to determine in advance how many stations are economically viable in any given market are extremely difficult and subject to a high degree of uncertainty. Viability depends upon many factors, including, perhaps most importantly, the potential broadcaster's successful estimate of what services will appeal most to his target audience.

[11] In the context of this proceeding, the only possibility of such foreclosure lies in the possible impact of additional VHF service in given markets upon the viability of UHF television as a whole. This question is discussed in Sections IV and V, *infra*.

[12] In addition to the value of allowing more diversity of voices, additional opportunities for broadcast signals allow viewers more ability to influence the type of services that will be made available. If the number of outlets increases, each may serve a slightly smaller audience. The smaller audience size in turn is likely to make the broadcaster more sensitive to the specific tastes of that audience.

[13] Several economic studies have shown that viewers were willing to pay more for such additional service than it would have cost to offer the service. See, for example, Noll, Peck, and McGowan, *Economic Aspects of Televison Regulation*, (Washington, D.C.: Brookings Institution, 1973), which (at 25–26, 287–288) attempted estimates in the early 1970's of consumers' valuations of televison service based on data collected in the late 1960's. First, they examine by income group what people "* * * would pay rather than have free TV disappear * * *" They found that, on average, in 1965 the level of services available were worth approximately $350 per household. *Id.* at 26. The authors were careful to note that for the poor, especially, the estimates probably understated the value of the services. Therefore, the $350 figures was likely to be too small, all else equal. The analysis was based upon data collected during a study performed in Hartford, Connecticut, from 1963 to 1965 involving an experimental broadcast subscription TV service, and using certain assumptions by the authors regarding the income elasticity of demand for the TV service.

See also Cable Economic Inquiry, Report in Docket No. 21284, at 47–50, not 5, for a summary. Other studies are W.S. Comanor and B.M. Mitchell, "Cable Television" (1971); R.E. Park, "Prospects for Cable in the 100 Largest Television Markets." 3 *Bell Jour. of Econ. and Management Sci.* 130 (1972); Charles River Associates, Inc., "An Analysis of the Demand for Cable Television." (1973); The John Hopkins University Center for Metropolitan Planning and Research, K. Lyall, R. Duncam, and C. DeKay, *Estimation of an Urban Cable Demand Model and its Implications for Regulation for Major Markets* (1976).

[14] *See* Staff Report on: *Low Power Television (BC Docket No. 78–253)*, September 1980.

Table 1: Use of Television Channels Summarized as of December 31, 1979

Channel Status	Market Designations a/ 1-50		51-100		Total 1-100		101-150		151-200		Total 101-200		Total 1-200		201-609		Total U.S. b/		Commonwealth and Possessions 610-626	
	V	U	V	U	V	U	V	U	V	U	V	U	V	U	V	U	V	U	V	U
Commercial Channels																				
Total Allocated c/	157	190	108	143	265	333	112	95	65	78	177	173	442	506	136	142	578	648	12	23
Licensed d/	157	79	107	53	264	132	109	31	57	19	166	50	430	182	70	25	500	207	10	1
Construction Permit e/	--	31	1	12	1	43	1	10	2	9	3	19	4	62	3	7	7	69	1	--
Application	--	48	--	24	--	72	--	11	2	3	2	14	2	86	8	20	10	106	--	1
Vacant	--	32	--	54	--	86	2	43	4	47	6	90	6	176	55	90	61	266	1	22
Non-Commercial Channels																				
Total Allocated c/	31	99	17	76	48	175	21	56	15	46	36	102	84	277	52	293	136	570	6	8
Licensed d/	28	55	17	35	45	90	17	21	10	11	27	32	72	122	34	47	106	169	4	--
Construction Permit e/	1	2	--	3	1	5	2	2	--	--	2	2	3	7	2	5	5	12	--	--
Application	1	2	--	3	1	5	--	3	1	2	--	5	1	10	--	5	2	15	--	--
Vacant	1	40	--	35	1	75	2	30	5	33	7	63	8	138	15	236	23	374	2	8

a/ The market designations are those used in the FCC industry market reports of television broadcast financial data. The markets numbered 1-212 are in approximate Arbitron rank by ADI television households, 1978. Additional markets numbered 213-609 are listed alphabetically by states; the markets in Alaska and Hawaii are included in this group. The markets in Guam, Puerto Rico and the Virgin Islands are numbered 610-626.

b/ Excludes 24 UHF Channels assigned for land mobile use and not available until further FCC action.

c/ VHF and UHF Channels allocated for commercial use but reserved or used for non-commercial use are included with non-commercial channels. UHF channels assigned for land mobile use and not available until further action by the Commission are excluded.

d/ May include stations licensed but not on the air.

e/ May include stations not licensed but on the air with program test authority.

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16. It is not surprising that the television spectrum, as currently allocated, is totally saturated in the large markets. The Table distributed channels geographically such that the number of stations *per capita* was smaller in large markets than in smaller markets.[15] The low number of stations per capita and total saturation in the large markets suggests there is unmet consumer demand for television services in these markets. Predictably, alternate methods of delivering television signals—such as multipoint distribution systems (MDS)—have been implemented or been applied for in those cities. In fact, the demand for MDS has been so great, resulting in many mutually exclusive applications, that the Commission currently has an open rulemaking proceeding in which it is considering expanding the number of MDS channel.[16] Also, despite the great cost of laying cable in urban canyons,[17] cable television is being demanded and introduced in these markets—often with the capability for many channels in recognition of the great diversity of tastes in large urban markets.

17. In medium sized markets, there remain some vacant UHF channels. This could be interpreted to indicate a lack of demand for additional television service. It is possible, however, that there exists an unmet demand, but because of the higher cost of television signal delivery inherent in UHF vis-a-vis VHF,[18] a potential broadcaster would not be able to recover his costs in the UHF mode, but could with VHF. Thus, allowing short-space VHF might afford the broadcaster greater flexibility in his investment decision and might result in additional service to the public that might not otherwise be provided or that might not be provided for a lengthy period of time.

18. The continued flow of applications for conventional television, subscription television, and multipoint distribution system licenses indicates that entrepreneurs are willing to risk their capital to provide additional television service. This, in itself, is a strong indication that knowledgeable parties believe there remains a substantial unmet consumer demand for television service. Most dramatic of all, of course, is Comsat's announced intention to implement a direct broadcast satellite system at a cost of over half a billion dollars. These investment decisions are consistent with the fact that both television station profits and television station transfer prices continue to rise rapidly. Broadcast income for all television stations increased from $513.2 million in 1974 to $1,273.5 million in 1978, a 25.51% per annum compound rate of growth.[19] During the same period of time, the implicit price deflator for the gross national product, a measure of the rate of inflation in the economy as a whole, rose from 116.02 to 152.05, a compounded annual rate of only 6.99%.[20] There is no aggregate picture of the value of television station licenses; we must rely on transfer price information. When scrutinizing transfer prices, there are many variables at play (e.g., size of market, UHF vs. VHF, power, etc.) and too few transfers to yield many observations. Hence, we are not able to estimate the rate of growth in the value of television stations. Nonetheless, trade press accounts suggest rapidly increasing transfer prices. For example, an article in the August 20, 1979 issue of *Broadcasting*,[21] entitled "Price tags for stations on a skyrocket," cites specific examples of, and quotes industry experts who refer to, the rapidly increasing prices for television stations.

19. The finding of unmet demand is also buttressed by the findings of a Louis Harris and Associates survey performed for the UHF Comparability Task Force.[22] The survey of a nationally representative sample of viewers indicated that 50 percent of the viewers would pay $5.00 per month for a first-run movie channel, 20 percent would pay that amount for an all-sports station, but less than 20 percent would pay $5.00 for variations of currently available programming such as is found on PBS or commercial networks. Although 80 percent of the viewers were satisifed with the number of channels available to them, only 66 percent expressed satisfaction with the availability of programs that appealed to them.[23] Moreover, to the extent that a new station in a market reduces expected market shares and makes specialty audiences more attractive to stations, then added channels will result in programming more responsive to consumer tastes. In all, despite the lack of hard data to directly measure demand, there is strong evidence that substantial unmet demand for television service exists and that the provision of additional service would be in the public interest.

20. The second benefit from increased service is the potential it brings for increased diversity in programming voices. Diversity of programming has long been a prime Commission goal and is closely related to first amendment objectives. As noted many years ago, the first amendment "rests on the assumption that the widest possible dissemination of information from diverse and antagonistic sources is essential to the welfare of the public * * *" *Associated Press* v. *United States*, 326 U.S. 1, 20 (1944). It has also been said that "[i]t is the purpose of the first amendment to preserve an uninhibited marketplace of ideas in which truth will ultimately prevail, rather than to countenance monopolization of the market * * *" *Red Lion Broadcasting Co.* v. *FCC*, 395 U.S. 367, 390 (1969). Clearly, adding more television voices in markets where our past policies have had the effect of limiting them promotes this first amendment purpose. We also recognized the benefit of diversity in our pending Radio Deregulation proceeding where we stated "society as a whole benefits when its citizens have access to many points of view (or diversity of opionions or 'voices') on both problem-oriented and issue oriented matters," *Deregulation of Radio*, 73 F.C.C. 2d 457, 516 (1979); and concluded that while some of our rules and policies aid in this goal "a better key to attaining many voices * * * is a structural one—maximizing the number of stations in a market." *Id.* at 517. Thus, our proposal today is another step in advancing this important First Amendment objective.

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[15] For example, the top three markets (New York, Los Angeles, and Chicago) contain approximately the same number of television households as do the 123 smallest markets combined, though nowhere near as many stations.

[16] However, it is in those large markets where additional channels are least likely to be available.

[17] An "urban canyon" refers to a densely populated area where cable must be run underground. In some of these urban areas, the underground cable ducts already may be full, thus requiring the installation of new ducts.

[18] *See* Staff Report on: *Comparability for UHF Television:* Final Report, September 1980, Chapter 5.

[19] "TV Broadcast Financial Data—1978." F.C.C. News Release 19540, July 30, 1979, Table 3. These are the most recent aggregate data available. The total number of television stations whose data were included in these totals increased from 696 in 1974 to 708 in 1978. The compounded annual rate of growth of income *per station*, therefore, was 24.99%.

[20] *Economic Report of the President*, January 1980, Table B–4, at 208, Department of Commerce, Bureau of Economic Analysis.

[21] Vol. 97, No. 8, at 23–24.

[22] *See* Staff Report on: *Comparability for UHF Television:* Final Report, September 1980, at 29–30.

[23] In assessing these results, it is worth keeping in mind that cable subscribers were excluded from the sample. Hence, in those areas where cable was available, those who most valued increased viewing options were probably excluded from the sample, since they probably subscribed to the cable service, making these relatively conservative estimates of demand. Approximately 21 percent of the potential respondents were excluded because they subscribed to cable.

III. Background Concerning Television Channel Allotments[22]

21. The history of television allotment principles has been set forth many times, including a detailed discussion in the 1977 *Notice* in Docket No. 20418, and need not be repeated at length here.[23] Recitation of that history's highlights, however, with a view toward the action proposed today, is appropriate.

22. Present fundamental television allotment principles, including the Table and the mileage separations on which it is based, date from the *Sixth Report and Order*, 41 F.C.C. 148 (1952). In addition to adoption of a Table alloting specific VHF and UHF channels to communities throughout the United States to be used by television stations licensed to serve those communities [24], the *Report and Order* set forth some other concepts especially pertinent here:

(a) The Table adopted contained [and still contains] many communities with both VHF and UHF channels alloted, a so-called "intermixed" system. Rejecting arguments by Allen B. DuMont Laboratories, Inc., and others that UHF would not develop under these circumstances, the Commission concluded that in time UHF would be able to compete effectively. Despite arguments that greater spectrum efficiency would result from an allotment system that created separate all-VHF and all-UHF markets,[25] the Commission chose intermixture primarily for two reasons:

An all VHF market might restrict service in some large cities to the limited number of stations possible on VHF television channels, while at the same time "all-UHF" cities and surrounding areas might be deprived of the wide-area coverage provided by VHF. The suggestion of moving all television to UHF was also rejected, the Commission noting the absence of any specific showings or proposals that might serve to justify the extensive reallocations and reassignments that would be required.[26]

(b) The *Sixth Report* adopted rather large permissible maxima for both effective radiated power (100 kilowatts (kW) for low VHF channels, 316 kW for high VHF channels, 1 megawatt (MW) for all UHF channels [27]) and antenna height above average terrain (1,000 ft. for VHF in zone 1 [28], 2,000 ft. for VHF in other zones, 2,000 ft. for UHF in all zones), in order to afford opportunity for stations to achieve wide-area coverage. In support of its policy favoirng wide-area coverage, the Commission adopted minimum mileage separations between stations designed to provide each station with a fairly large interference-free area. Since various proposals under consideration at the time for limited power stations and shorter spacings would have vitiated the benefits the Commission saw accruing from its plan for wide-area coverage stations, it rejected such proposals, stating that it did "not believe that limited power stations should be provided for in The Table of (Television Channel Allotments) *at this time* in order to squeeze in additional allotments." [29]

(c) The Commission discussed requests that, in appropriate cases, the "shielding" between stations afforded by rough terrain be taken into account, to permit assignments at less than minimum separations. It also considered suggestions that shorter separations be permitted where one station would protect the other by a directional transmitting antenna. Despite the fact that both of these concepts were rejected, essentially on the ground that not enough was yet known about the full implications of such operations, their future use was clearly not ruled out if a more information record could be provided.[30]

23. After several years experience with the framework provided by the *Sixth Report and Order*, it was clear that many UHF stations were having financial problems and that VHF service was fast becoming the medium of preference.[31] This is turn was impeding the establishment of a nationwide television service.

24. On September 10, 1955, the Commission promulgated a *Notice of Proposed Rulemaking (NPRM) in Docket No. 11532 to consider proposals directed at solving the television allotment problem, noting that:*

A nationwide competitive television service has not been realized to the extent contemplated at the time the Commission issued its *Sixth Report and Order*. Many of the smaller communities are without a first local outlet and the expansion of multiple, competing service in the larger economic and population centers of the country is lagging. Difficulties encountered in achieving successful operation of stations in the UHF band have been a significant factor leading to this situation.[32]

25. On June 25, 1956, the Commission issued its *Second Report on Deintermixture* [33], concerning the issues raised in its *Notice of Proposed Rule Making* in Docket No. 11532, *supra*. [34] It admitted that at least two serious problems hindered the continued expansion of television services. The first was the severe limitation on the number of channels available in the VHF band, and the second was the "UHF problem," which was accentuated by, (a) the preponderance of VHF-only receivers in use, (b) the serious performance deficiencies in UHF transmitters and receivers, and (c) the resulting preference of program and revenue sources for VHF outlets. The Commission concluded that "many UHF stations which normally cannot provide a viewing audience comparable to those of their VHF competitors have been forced to operate on a marginal or submarginal basis or cease operation." [35]

26. In the *Second Report on Deintermixture*, the Commission evaluated the proposed solutions submitted by the various parties. Four major proposals were analyzed.

(1) The Allocation of Additional VHF Spectrum

27. The Commission stated that before the initiation of Docket No. 11532, it had undertaken negotiations with The Office of Defense Mobilization to ascertain whether any government VHF frequencies could be made available to broadcasters. Citing "National security requirements and the need of air navigation and air communications," the Office of Defense Mobilization

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[22] The findings and arguments in this Section are primarily based on Section VI, "Commission Attempts to Rescue UHF" of the staff report on: *Preliminary Report on Prospects for Additional Networks* (Preliminary Report) Network Inquiry Special Staff, Federal Communications Commission at 96 (February 1980).

[23] *See, e.g., Petition for Rule Making to Amend Television Table of Assignments to Add New VHF Stations in the Top 100 markets and to Assure that the New Stations Maximize Diversity of Ownership Control and Programming*, 63 F.C.C. 2d at 847–856 (1977). *See also*, a recent comprehensive account contained in "The Effect of the Federal Communications Commission's Spectrum Management Policies Upon the Number of Television Networks", Thomas L. Schuessler, contained as an Appendix in the Commission's Network Inquiry Special Staff's *Preliminary Report on Prospects for Additional Networks* at 1–88 (February 1980).

[24] The Table was adopted as a way of providing more efficient channel usage than would a "demand" application system, as a way of providing channels for smaller markets where demand might be slower to develop, and as a means of expediting the handling of the forthcoming flood of applications. *See* 41 F.C.C. at 151–152 (paragraphs 13–16) (1952).

[25] The shifting of all television service in a community to either all VHF or all UHF Channels is called "deintermixture."

[26] 41 F.C.C. 155, 208, para. 25, 197 (1952).

[27] Since raised to 5 MW (except within 250 mile of the U.S.-Canada border). *See Report and Order* in Docket No. 11592, 13. R.R. 1571 (1956).

[28] Zone I corresponds roughly to the Northeastern United States except for extreme Northern New England; Zone III consists of a band of land approximately 150 miles wide along the Gulf Coast; and Zone II consists of the remainder of the continental United States, Puerto Rico, Alaska, Hawaii, and the U.S. Virgin Islands. *See* 47 CFR 73.609.

[29] 41 F.C.C. 148, 188 (1952), emphasis added.

[30] *Sixth Report and Order*, 41 F.C.C. at 187, paragraph 133, (1952); 41 FCC 213–215, paragraphs. 215–221 (1952).

[31] *See Preliminary Report on Prospects for Additional Networks*, Network Inquiry Special Staff, at 90, Federal Communications Commission.

[32] *Notice of Proposal Rulemaking* in Docket No. 11532, 20 Fed. Reg. 8501 (November 10, 1955).

[33] 13 R.R. 1571 (1956). (Hereinafter referred to as the *"Second Report."*)

[34] Some of the important issues raised in the NPRM for alleviating the difficulties involved: (1) The reduction of the minimum mileage separation to create additional VHF allotments; (2) proposals for modification of the then present standards that would permit the use of directional antennas, cross polarization, new limits on antenna height and power restrictions; and (3) deintermixture.

[35] *Second Report, supra* at 1574.

concluded that such frequencies could not be released.[36]

(2) Short-spaced VHF Allotments

28. The American Broadcasting Company (ABC), then the weakest of the three networks, proposed the allotment of additional VHF channels at mileage spacing substantially shorter than that required in the *Sixth Report.* However, the Commission was doubtful that the allotment of additional VHF channels with substantially shorter mileage separations would adequately serve future needs. Such short spaced stations, it observed, would "reduce the service area of existing VHF stations and create new interference areas within which satisfactory signals might not be received either from existing stations or from the new stations." [37] The Commission acknowledged, however, that interference problems could be limitated to some extent by requiring the station to use directional antennas, lower antenna heights, reduce power emission and implement cross polarization. Yet perhaps more important, it concluded that even with maximum exploitation of short spaced allotments, it was unlikely that enough television stations could be created by this method to meet the expected nationwide needs in the future. Moreover, the Commission feared that the wide-spread use of such allotments would discourage the development of additional UHF stations as well as having an adverse impact on those on the air.

(3) Deintermixture

29. Several parties advocated deintermixing markets containing both "UHF and VHF channel allotments in order to more nearly equalize competitive opportunities in individual markets while at the same time utilizing both the VHF and UHF bands in the nationwide television system." [38] Although the Commission rejected deintermixture on a nationwide basis because there was little support for eliminating VHF in areas with low UHF set saturation, it stated that deintermixture deserved careful consideration as a means of enhancing the opportunity for effective competition among a greater number of stations in certain individual areas.[39]

(4) All UHF Television

30. Another recommendation by some industry representatives involved shifting all television broadcast to the UHF band. This would have had the effect of depriving VHF stations of their technical superiority over UHF and place all stations on a comparable technical basis. The Commission reasoned, however, that such an approach was fraught with problems. One was the effect that terrain and natural impediments had on weakening and blocking UHF transmission. The second problem was the tremendous cost and dislocation to the public and industry of switching to an all UHF system.[40]

31. These proposed alternatives were rejected, not so much for their technical insufficiency, but basically for the same reasons as in the *Sixth Report.* The Commission was still convinced that its plan as set out in the *Sixth Report* held the best opportunity for a truly competitive nation-wide television service. With particular reference to additional VHF allotments utilizing reduced power and height and directional transmitter antennas, the Commission recongnized some of the interference problems could be solved, but concluded that the creation of "numerous" small VHF stations with very limited service areas would not further two long-range objectives, i.e., wide area coverage and UHF growth.

32. Five years later, however, with the continuing and increasing pressure for three competitive commercial outlets in cities of substantial size to serve as outlets for each of the three existing networks, efforts were again undertaken to speed the institution of new television service. In the 1961 *Report and Order* in Docket No. 13340,[41] the Commission recognized shortcomings in its allocation structure, and concluded that short-spaced VHF allotments should be proposed in eight markets that met certain conditions.[42]

33. The Commission examined the various means for adjusting its planning factors to minimize the increase in interference that would result if full facility stations were added at less than the minimum separation distance. It settled on a procedure first suggested to it by proponents of limited power VHF stations during the deliberations that culminated in the *Sixth Report and Order.* The methodlology, called "equivalent protection," involved a separation distance—effective radiated power (ERP) trade-off.[43] The concept of equivalent protection was adopted by the Commission in Docket No. 13340 as a possible means of alleviating the shortage of VHF stations in some large cities.[44]

34. The question of equivalent protection was again discussed by the Commission in its 1967 decision providing for the establishment and use of antenna farm areas. In the *Notice of Proposed Rule Making* in this proceeding we proposed to amend § 73.612 of the Rules—a rule section which limits the nature and extent of protection from interference accorded television Broadcast stations—to provide for short-spaced stations "only on the basis of equivalent protection." [45] In its *Report and Order* in Docket No. 16030, 10 R.R. 2d 1514 (1967), the commission adopted a new § 73.612(b) which provided that:

> When the Commission determines that grant of an application would serve the public interest, convenience and necessity and the instrument of authorization specifies an antenna location in a designated antenna farm area which results in mileage separation less than those specified in this subpart, TV broadcast station permittees and licensees shall be afforded protection from interference equivalent to the protection afforded under the minimum mileage separations specified in this subpart. 47 CFR § 73.612(b)

35. This action was taken over the objections of Maximum Service Telecasters (MST) that the equivalent protection concept had been adopted by

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[36] *Id.* at 1575.

[37] *Id.*

[38] 13 R.R. 1571, 1576 (1956).

[39] *Id.*

[40] "In 1955 a Commission economist predicted that an all UHF system would result in a loss of service to as many as three to six million families which now receive VHF stations. In addition, he predicted that many more would lose service as the result of poor terrain despite the fact they were well within the service area of potential UHF stations." Staff Report on: *Preliminary Report on Prospects for Additional Networks (Preliminary Report),* Network Inquiry Special Staff, Federal Communications Commission at 107.(February 1980).

[41] *Interim Policy on VHF Television Assignments and Amendments of Part 3 of the Rules Concerning Television Engineering Standards,* 21 R.R. 1965, 1709 (1961 Supp.).

[42] The eight markets were Oklahoma City, Okla.; Johnstown, Pa.; Baton Rouge, La.; Dayton, Ohio; Jacksonville, Fla.; Birminghan, Ala.; Knoxville, Tenn, and Charlotte, N.C.; Providence, R.I. and Syracuse, N.Y. were originally included but then ways were found to provide additional VHF channels at standard spacings. The requirements were that the market be among the top 75 and have two VHF stations operating, that there be minimal dislocation to existing stations and no significant impact on UHF stations in other cities, that the potential service gains outweigh the losses, that international requirements were met, and that the separation would not be less than 140 miles for co-channel stations or 40 miles for adjacent channel stations.

[43] The idea of this type of trade-off was something the Commission had long recognized as desirable in some instances. The Rules already provided that licensees could employ antennas in excess of the specified maximums if they compensate by lowering their effective radiated power sufficiently. *See* 47 CFR 73.612(b) (1978).

[44] 10 R.R. 2d 1514, 1523, paragraph 17 citing *Interim Policy on VHF TV Channel Assignments,* Docket No. 13340, 21 R.R. 1699 (1961); *Supplement to Report and Order,* Docket No. 13340, 21 R.R. 1709 (1961).

[45] *Report and Order* in Docket No. 16030, 10 R.R. 2d 1514 (1967).

the Commission in Docket No. 13340 only for the limited purpose of the drop-in cases before the Commission in 1961 and therefore should not be employed in this late context. The Commission noted that *

MST's arguments against the "equivalent protection concept" have been considered by this Commission in Docket (No.) 13340, and in subsequent proceedings. After completion of the rule making in Docket (No.) 16004, in which we expect to adopt curves and procedures for * * * TV broadcasting, we will issue an Order outlining the procedure to be followed in determining equivalent protection for * * * VHF and UHF co-channel stations. As far as the VHF adjacent channels . . . these matters will be considered on an *ad hoc* basis if and when the problems arise. 10 R.R. 2d at 523–24 (1967).

By rejecting MST's "attack [on] the equivalent protection concept which [the Commission] adopted in Docket [No.] 13340," the Commission effectuated the following results:

(1) It reaffirmed its earlier conclusion that equivalent protection concept was technically acceptable means of short spacing stations;

(2) It implemented the concept by adding a provision to the rules requiring short-spaced stations to use the equivalent protection methodology;

(3) It confirmed that the methodology used was that set out in the *Supplement* to the *Report and Order* in Docket No. 13340; and,

(4) It indicated that the existing calculation methodology would be modified after completion of the proceeding revising the FCC propagation curves (Docket No. 16004).

36. Docket No. 16004 was terminated with a *Report and Order*, 34 R.R. 2d 361 (1975), which amend § 73.699 of 47 U.S.C. to add revised propagation curves to the Rules. At that time the Commission did not issue an order revising its outstanding equivalent protection methodology, to incorporate the revised F(50,50) and the new F(50,10) curves. As developed in detail below, we are today proposing rule changes which would incorporate the equivalent protection methodology into our Rules explicitely for the first time. Given the above somewhat contradictory history of whether or not equivalent protection is to be calculated using the current or the pre-1975 propagation curves, we wish to state clearly that the curves specified in the Rules at the time a petition or application is considered by the Commission are the curves referred to in the proposed rule section (§ 73.614(b)(5)). The propagation curves adopted in 1975 are presently the applicable curves. In addition, in section VIII, *infra* we will discuss how we propose equivalent protection of VHF adjacent channels to be calculated.

37. Seven of the short-spaced allotments proposed in the 1961 *Report and Order* were denied and one, Oklahoma City (more correctly a "move-in", *See* Para. 39, *infra)* was granted. *Television Assignment—Third Service*, 41 F.C.C. 1119 (1963). The decision to deny these new allotments was predicated on the enactment, by Congress, of the All-Channel Receiver Act [46] in July of 1962, empowering the Commission to adopt rules requiring that all television receivers shipped in interstate commerce, or imported, be capable or receiving all frequencies allocated by the Commission to television broadcasting. The Commission viewed this legislation as Congressional ratification of the FCC's commitment to the promotion of UHF as an integral part of the nations's television system, requiring hiatus in its VHF drop-in activities until this new authority could take effect. The Commission stated that its "judgment to reject short-spaced VHF (allotments) rests on optimism for the long range future of UHF * * *." [47] It should be noted, though, that the Commission's optimism was tempered with the commitment that "if events prove us wrong * * * we can always consider the "interim" or "short-range" actions such as these short-spaced (allotments)." [48] Having reached this conclusion, the Commission firmly stated its policy to scrutinize all VHF applications for their impact on UHF development, a policy that dominated the thinking in this area for over a decade. This policy is discussed in some detail in Section IV, *infra.*

38. The only true VHF drop-in allotment allowed after Docket No. 11532 was a short-spaced allotment made in *Charlotte Amalie, V..I.*, 26 F.C.C. 2d 853 (1970), for educational use. The station was required to provide equivalent protection to the stations to which it was short spaced. [49] Aside from the strong public benefit involved in the promotion of educational television, there were two distinctive factors: All of the predicted interference area was over water and, therefore, would affect no population, and there was no UHF station or application involved.

39. While there have been no new short-spaced VHF allotments in the continental United States, there have been a number of "move-in" authorizations—stations at standard spacings authorized to move closer to their city of license, even though such a move violated the minimum mileage separation rule. These have generally been permitted for two reasons—to improve the station's service and thus its competitive situation vis-a-vis others in the market or to permit location in an "antenna farm" or otherwise meet air navigation safety considerations. Equivalent protection was successfully utilized to protect existing co-channel television stations to the degree they were protected prior to the interim move. [50]

40. In other cases in the late 1950's and early 1960's, VHF channels, called "squeeze-ins," were newly alloted to communities at separations quite close to the minimum, sometimes with changes in other VHF allotments being necessary to accommodate the new channel. Many of these were the third VHF commercial allotment designed to provide three competitive network outlets. [51] Three such decisions in 1961 involved Grand Rapids, Mich., 21 R.R. 1737 (1961) (a second VHF channel for Grand Rapids and a third for the Grand Rapids-Kalamazoo market); Rochester, N.Y., 21 R.R. 1748 (1961); and, Syracuse,

[46] Pub. L. No. 87–529, 87th Cong. 2d Sess. (1962), 47 U.S.C. 303(s) (1962).

[47] 41 F.C.C. at 1124 (1952).

[48] *Id.* at 1124.

[49] 26 F.C.C. 2d 853 (1970).

[50] Examples of moves to improve service are *Peninsula Broadcasting Corp.*, 45 F.C.C. 1662 (1964), *Television Broadcasters, Inc.*, 45 F.C.C. 1897 (1965), and two Albany, N.Y. stations *Capital Cities Broadcasting Corp.*, 24 R.R. 1067 (1963) and *Van Curler Broadcasting Corp.*, 24 R.R. 1079 (1963). The Commission's policy concerning antenna farms was set forth in *Antenna Farm Areas*, 8 F.C.C. 2d 559 (1967). Examples of authorizations granted on this basis are *Midcontinent Broadcasting Co.*, 45 F.C.C. 1798 (1964); *Coral Television Corp.*, 8 F.C.C. 2d 749 (1967); *WTCN Television, Inc.*, 14 F.C.C. 2d 870 (1968) and *The Outlet Company*, 11 F.C.C. 2d 528 (1968). In 1962 the New Bedford, Mass. channel 6 station was permitted to move in closer to Providence, R.I., to a location which is short-spaced with respect to Schenectady-Albany Channel 6 (WRGB). As a result, all three Albany-Schenectady-Troy VHF stations are short-spaced with respect to co-channel stations.

[51] Some of the inequality between VHF anf UHF can be explained by the inherent propagation advantages of VHF transmission. To that extent, it enhances spectrum efficiency to use the VHF television spectrum intensively to provide broader service to the public. Some of the advantage is accentuated and perpetuated, However, by past allotment practices that have been designed to assure at least three-network service stations, but not more, to each of the top markets. These policies have restricted entry into these markets, conferring supernormal profits on some of our VHF television licensees, giving them a chronic competitive advantage over the UHF operator. In 1978, the average VHF station had net revenues of $3,784,600. After adjustment for a 13.8% increase in expenses, the resulting profit was $1,072,900 or a 32.5% increase in profits over the previous year. *Broadcasting* at 23 (July 9, 1979). In the long run, intensified competition in the VHF television band could be expected to distribute both service and profits more evenly and so make the UHF operator more comparable to its VHF television competitors than is true today.

N.Y., 21 R.R. 1754 (1961). The earlier Albany-Schenectedy-Troy, NY. decision led to the allotment of two VHF channels at near-minimum standard spacing and, as mentioned the stations were later permitted to move in.[52] A later action, *Mt. Vernon, Illinois,* 17 R.R. 2d 1620 (1969), is perhaps an extreme example of this: To meet separation requirements, the station's transmitter would have been required to be located approximatedly 30 miles north of Mount Vernon, within a small triangular area with sides one to two miles long.

IV. History of the UHF Impact Policy

41. When, in the late 1950's it became evident that UHF television was not developing at the rate expected at the time of the *Sixth Report,* the Commission instituted an affirmative policy of fostering such development. The core of this policy involved the denial of attempts to create new or change existing VHF service which might have an adverse effect on UFH stations. In *Triangle Publications, Inc.,* 29 F.C.C. 315 (1960), the Commission denied an application by a New Haven, Connecticut, VHF station to move its trasmitter some 14 miles north in the direction of a Springfield, Massachusetts, UHF station. The reasoning in this case became a standard followed for years thereafter—that economic injury to a UHF station is reason to deny a change in a VHF facility if the public interest would be affected by injury to the UHF service. The decision quoted as follows from the *Fresno Deintermixture* rule making decision (Docket No. 11759, 19 R.R. 1581, 1585, (1960):

> If there is one circumstance which has been established beyond doubt in the manifold experiences of UHF operators everywhere that they compete with VHF, it is that, for a complex of familiar reasons related to receiver conversion, advertiser support, program availabilities and other related factors, UHF operations, however serviceable to the public, are subjected to competitive adversities which impose seemingly inescapable and substantial burdens upon the chances for financially successful operation of a UHF service in competition with an available VHF service.

42. After enactment of the 1962 All-Channel Receiver Law, the Commission denied various rulemaking proposals for additional VHF channels, both short-spaced allotments and others at standard separations such as in *Columbia, South Carolina,* 25 R.R. 1714f (1963). It was concluded that the statutory enactment of the All-Channel Receiver Law was an implicit directive to the Commission to foster UHF development, requiring denial of opportunities for additional VHF service that might adversely affect such development. Although no substantive data was relied on, the conclusion was reached that an "inevitable" negative affect would result. In a second *Triangle Publications, Inc.,* decision, 37 F.C.C. 307, 321 (1964), the Commission adhered to this policy, despite enactment of the All-Channel Receiver Law, stating: [53]

> For UHF to be a truly competitive service, there must be a capability of reception throughout the service contour and not merely within the limits of its home counties. It will be several years before the all-channel receiver legislation has an appreciable effect upon set conversion, whereas the impact upon the existing UHF stations from the encroachment of the VHF signal upon their service areas will be immediate. As we stated in the *Springfield Deintermixture Case,* FCC 62-798, 23 R.R. 1579, 1590 (1962): "[I]n time, the all-channel receiver legislation may alleviate this situation by, for example, increasing to 100 percent the number of homes in Champaign and Vermilion Counties equipped for UHF reception (now estimated to be 62 and 81 percent, respectively). But surely it makes little sense to take dislocating action to worsen the competitive situation in the hope that it will be improved years from now." Moreover, our goal is to hasten UHF conversion in advance of expectable set replacement to the extent possible.

43. Denial of VHF facility increases, however, was not automatic. In designating for hearing three Iowa VHF-TV station applications for increases in output power because of impact on a Ft. Dodge, Iowa UHF station, the Commission stated that it was appropriate to explore the extent to which other services would be available to populations served by the UHF station in the event of its demise. Two of the three applications were later granted because of the small extent of impact (VHF Grade B overlap of only 16% of the UHF coverage area), various joint measures taken to guarantee the UHF station's survival, and the lack of potential for other UHF stations in the small communities within the overlap area. *KTIV Television Co.,* 4 R.R. 2d 243 (1965). In *Atlantic Telecasting Co.,* 3 F.C.C. 2d 442 (1966), the Commission refused to designate for hearing a VHF-TV station's application for an increase in facilities on the basis of unsupported allegations of UHF impact.

44. During the 1960's and 1970's, "UHF Impact" cases often became battles of experts, since there was no reliable indicator as to what was "injury adverse to the public interest." A multitude of criteria were employed in various cases, including: Stability of the market and maintaining a fair possibility for UHF development, *Midwest Television, Inc.,* 13 F.C.C. 2d 478, recon. denied, 15 F.C.C. 2d 84 (1968); decreased ability to attract advertising, *Cosmos Broadcasting Corp.,* 21 F.C.C. 2d 729 (1970); ability to secure or retain network affiliation, *Cosmos, supra; Selma Television, Inc.,* 12 F.C.C. 2d 781 (1967); *WLVA, Inc.,* 15 F.C.C. 2d 757 (1968); *South Carolina Educational Television Commission,* 39 F.C.C. 2d 180 (1972);[54] audience fragmentation, future UHF potential, *Selma Television, supra: Daily Telegraph Printing Co.,* 20 F.C.C. 2d 976 (1969); first time overlap and/or increased overlap of signals, *Daily Telegraph, supra;* first time service for audience *Cosmos, supra;* and past financial profitability of UHF station, *Capital Cities Communications, Inc.,* 59 F.C.C. 2d 435 (1976).

45. It was early recognized that in this area any conclusion would often be highly speculative, since seldom if ever would there be positive proof of impact or the absence of it. In *Midwest Television, Inc.,* 13 F.C.C. 2d 478 (1968), the Commission, applying for the first time the "UHF Impact" policy to the importation of distant signals on CATV, stated that no definite finding could be reached that UHF television would or would not succeed in the market (San Diego); the only way to find out is to maintain the market for a period free of distant signal competition, to give UHF television a chance to develop. If no UHF station materialized, the situation could be reexamined (13 F.C.C. 2d 502 (1968)).

46. While "UHF Impact" has been applied in some other cases (e.g., *Jefferson-Pilot Broadcasting Co.,* 42 F.C.C. 2d 908 (1973)), it has not always stood as a bar to increased VHF service or improvements in facilities. In *Mount Vernon, Illinois,* 17 R.R. 2d 1620 (1969), the Commission added a VHF channel (at minimum separations) because of the substantial first service and local outlet benefits that would accrue. The very slight impact on existing or potential UHF development was found not to be a ground for denial.[55] The same result was

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[52] *Report and Order* in Docket No. 11751, 15 R.R. 1514a (1975).

[53] The second *Triangle* case involved the same requested facilities change as the first *Triangle* case except that the antenna would be directionalized to afford a degree of protection to the UHF stations. This too was denied.

[54] The *South Carolina* case held that where there is a network "white area," i.e., an area with no usable signal containing a sizeable community (there, Florence, South Carolina and the ABC network), there is a presumption that a UHF station would get a network affiliation.

[55] In view of the passage of time since the All Channel Law, the *Mount Vernon* case stated that it is unnecessary to "insulate every UHF station or potential station from any possible small wind of VHF impact where there is a substantial service

Footnotes continued on next page

reached in *Cosmos Broadcasting Co., supra,* concerning increased transmitter facilities. There the VHF station showed the likelihood of only minimal, rather than substantial, impact and there were substantial first and second service benefits to be gained.

47. *The Cosmos* case put the "UHF Impact" question in terms of a balance between two potentially conflicting objectives: (1) Encourgaging VHF stations to expand to make the most efficient use of their channel allotments by serving more people; and, (2) fostering UHF development. In *South Carolina Educational Commission, supra,* it was held that where these policies come into real conflict—i.e., where the UHF impact is more than minimal—the UHF policy must prevail. If the impact would be only minimal, the VHF application need not be denied, particularly if substantial public benefits would result. The same result was reached by the Commission in *Daily Telegraph Printing Co.,* 56 F.C.C. 2d 990 (1975), where it was held that, if there will be substantial adverse impact on existing or potential UHF development, the VHF application could not be granted even if the benefits would outweigh any loss.

48. Shortly thereafter, however, the Commission changed its analysis of this principle. In *WFMY Television Corporation, Inc. ("WFMY, Inc."),* 59 F.C.C. 2d 1010 (1976), it held that regardless of the character of the impact, "minimal" or "substantial," a comparison would be made between the possible adverse consequences of impact and the gains from the increase in VHF service to determine whether the public interest would be better served by the increased VHF service. This change was premised upon the Commission's belief that "UHF broadcasting had advanced to the point where a much more 'substantial' impact can be tolerated without disservice, overall, to the public interest." The *WFMY, Inc.* case also modified the requirements for establishing impact, requiring a showing of the likelihood of *specific* impact related to the advent of expanded VHF service. The Commission noted its disinclination to insulate UHF stations from competition and stated that what is important is "that the UHF station be afforded an opportunity to develop free from * * * substantially adverse competitive circumstances (citation omitted)." If the opposition to the expanded use of VHF service was based on a claim of impact on *potential* UHF development, the party urging UHF impact had the burden of establishing the likelihood that, absent the VHF expansion, an application for a new UHF station would be filed within two or three years. In adopting this standard the Commission stated that it did not believe "that the public interest is served by foreswearing indefinitely the benefit of additional VHF service while awaiting the germination of dormant interest in an idle UHF allocation."[56]

49. The modified policies announced in *WFMY Inc.* were based on UHF porgress in the years just prior to the decision. The Commission stated that:

> We are aware of significant advances made by UHF television since the enactment in 1962 of the All-Channel Receiver Law, 47 U.S.C. § 303(s). These advances are beyond even those noted by Commission in the *Mount Vernon* allotment case, *supra,* at 1630. For example, in 1974 (the most recent year for which data is available) 48% of the UHF television stations reporting financial data indicated profitable operations for the year. UHF penetration, i.e., the percentage of households with UHF receivers, has increased, nationally, from 55 percent in 1969, the year of the *Mount Vernon* decision, to 89 percent in 1974, a figure exceeded in many areas with more than one UHF station. *WFMY Inc.,* 59 F.C.C. at 1015 (1976) (footnotes omitted).

50. There have been three significant "UHF Impact" cases since *WFMY Inc.* Two cases, *Central Alabama Broadcasters, Inc.,* 68 F.C.C. 2d 1339 (1978) and *KOTV, Inc.,* FCC 79–607, 44 FR 60818 (October 22, 1979), are in hearing status. The third, *North Carolina Television, Inc.,* 42 R.R. 2d 1685 (1978), was a grant of a VHF application without hearing. It was concluded that the benefits from the expanded VHF service (in terms of population receiving first and second services and first NBC service) outweighted the impact that could result from increased overlap with the UHF station, also NBC-affilitated. It was noted that the latter would have a stronger signal in the overlap area, and was in a larger market than the VHF station. It was also observed that the bulk of the overlap resulted from a recent transmitter move by the UHF station in the direction of the VHF station.

V. The Relevance of UHF the Impact Policy Today

51. The history of the "UHF Impact" issue demonstrates that since the enactment of the All Channel Receiver Law, the Commission has taken into account the overall profitability of stations in the UHF television service and the effects of implementation of that law when balancing the diversity gained from additional VHF service against the potential harm to UHF television service. Analysis of these factors today points to a conclusion that our past deep concern for the development of UHF television may no longer need to stand in the way of the added service possible from short-spaced VHF allotments. UHF television has made tremendous progress in recent years, as indicated in several areas. In 1978, the revenues of UHF commercial stations were $514 million, including $255 million to stations that were network affiliates and $259 million to independent UHF stations. These represented increases of 26.2 percent and 30.2 percent respectively over 1977 figures.[57] UHF network-affiliated and independent stations had 1978 profits of $42 million and $52 million respectively, up 53.6 percent and 18.2 percent from the corresponding 1977 net income figures. In 1973, only 31 percent of UHF stations reported net income; in 1975, UHF stations as a group were profitable for the first time with 52 percent showing profits; and in 1978, 73.1 percent of those reporting showed net income (136 out of 186). See the FCC's *Revised TV Broadcast Financial Data—1978* (July 17, 1980) and corresponding reports for earlier years.

52. Further, the number of UHF stations in operation has increased rather substantially, from 180 in 1970 to some 218 in early 1980. Even more striking is the increase in the demand for new UHF facilities evidenced by applications filed—between 8 and 15 per year during the 1971–1975 period compared to 94 in 1978, with more than 240 pending as of July 31, 1980.[58] The growing demand is also shown by high selling prices for stations. ABC mentions in its comments in Docket No. 20418 the $11,600,000 figure paid for a Houston independent UHF station in 1976; since then a UHF station sold for $20,000,000 (WRET–TV, Charlotte, North Carolina in 1979) and there have been at least three other sales of $15,000,000 or more (stations in Ft. Smith, Arkansas, Washington, D.C., and a pending application for a Baltimore, Maryland station).

53. Equally important as the increased profitability and the increased level of applications for UHF television stations are the developments that have followed

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Footnotes continued from last page

benefit involved in a different course. The time when such caution was appropriate has, in our judgment, passed." (17 R.R. 2d at 1630 (1969)).

[56] *WFMY, Inc., supra* at 1016.

[57] VHF figures for the same classes of stations were 20 percent and 9.0 percent respectively.

[58] For a recital of figures in this connection, see the *Notice of Proposed Rule Making Concerning Multiple Ownership of AM, FM and TV Broadcast Stations,* FCC 79–537, 44 FR 55603, (September 1, 1979).

from the implementation of the All-Channel Receiver Law. In *Triangle Publications, Inc.*, the Commission was concerned, in part, about the impact of increased VHF service availability on the market for UHF converters. In this period, viewers who wanted to receive UHF signals had to acquire a separate UHF converter. The demand for converters clearly related to the number and quality of the UHF signals in the market, as well as to the programming those stations offered. Moreover, most potential UHF viewers had to buy the converter before they could sample the programming to see if they really did want to watch it. From the point of view of potential UHF broadcasters, therefore, the more converters that were already in the hands of the public, the less risky was an attempt to start a UHF station.

54. The All-Channel Receiver Act changed the situation. Since its implementation, the number of viewers who do not have all-channel capacity has declined steadily. In the *WFMY Inc.* decision, the Commission noted that all-channel receivers were in 89 percent of households in 1974, up from 55 percent in 1969. It is now 98 percent or better.[59] Moreover, widespread penetration of all-channel receivers has not been the only result of the All-Channel Receiver Law. In a series of proceedings the Commission has moved to require that the technical parameters of the UHF portion of the receiver be comparable to those of the VHF portion. Thus, in the 1960's and 1970's the Commission ordered improvements in such features as (a) tuners,[60] (b) weak signal performance (noise figure),[61] and (c) comparable attached antennas.[62] As long as the tuning process is mechanical, it may be necessary generally to have UHF tuning involve an extra step, albeit a simple one; but electronic tuning, now coming into widespread use, promises to remove even that difference.

55. Nor do we intend to stop seeking further improvements that might offer significant gains to UHF reception. In 1978 the Commission formed a UHF Comparability Task Force to study measures for alleviating the remaining differences and, if possible, eliminating them completely. This group has issued a number of notices of inquiry and several reports, including one (September 1979) reviewing the whole area of VHF–UHF comparability.[63] In a companion proceeding today we have released the *Final Report of the UHF Comparability Task Force* [64] and are issuing a *Notice of Inquiry and Notice of Proposed Rulemaking* that seeks further improvements in UHF reception.[65] Nor is this work complete. Several ongoing research studies are looking at various aspects of UHF reception.

56. These efforts at technical improvement are doubly relevant here: They provide reasonable assurance that the "UHF–VHF difference" will be less than it is now at the time in the future when stations are likely to go on the air using any new VHF allotments, and reconfirm that the Commission is firmly committed to continuing to ensure that viewers will be capable of receiving comparable UHF service.

57. The *Final Report of the UHF Comparability Task Force* states that further technical gains in UHF reception, at least given the current technology, must come by inducing viewers to purchase and install improved UHF receiving antenna systems. To convince viewers to make such purchases requires that UHF broadcasters offer to viewers a program package that the viewers find particularly attractive. It can be argued that the problem of convincing viewers that better antennas are worthwhile is no different than that faced by the early UHF broadcasters, namely, to convince viewers to buy UHF converters. There are, however, at least two differences.

58. First, prior to the All-Channel Receiver Act viewers without a UHF converter had no access at all to UHF programming. In contrast, most viewers today can sample UHF programming. As already noted, due to the All-Channel Receiver Act virtually all viewers use receivers capable of tuning in UHF stations. Furthermore, most viewers can receive watchable if not always good quality pictures from UHF stations with their existing antenna equipment.[66]

59. Second, early UHF broadcasters who lacked network affiliations faced a severe shortage or program material suitable for advertizer sponsorship. UHF broadcasters now have a broader selection of programming than was available in the 1950's. The intervening years have seen the creation of a vast amount of programming, both material originally for television as well as movies, that can be acquired by UHF broadcasters.[67] Means of delivering these programs are also proliferating. Further easing the UHF programmer's task is the fact that video program production is no longer a new field, making it less difficult to learn how to produce local material should the broadcasters prefer that route.

60. In light of all these changes since the adoption of the UHF Impact policy, namely full implementation of the All-Channel Receiver Act, improvements in the technical parameters of the UHF television service, and the much more abundant programming available, the concern of the Commission that the amount of VHF coverage in a market would decrease the penetration of UHF receivers, expressed in the *Fresno Deintermixture* rulemaking decision, Docket No. 11759, 19 R.R. 1581, 1585 (1960), repeated in *Triangle Publications, Inc.*, 29 F.C.C. 315 (1960), in the second *Triangle Publications, Inc.* decision, 37 F.C.C. 2d 307 (1964), and in the *WFMY Inc.* decision, 59 F.C.C. 2d 1010 (1976), seems now to be answered.

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[59] *See* note 66, *infra*.

[60] *See, Report and Order*, 21 F.C.C. 2d 245 (1970); *Memorandum Opinion and Order*, 23 F.C.C. 2d 793 (1970); *Report and Order*, 32 F.C.C. 2d 612 (1971); *Report and Order*, 43 F.C.C. 2d 395 (1973).

[61] *First Report and Order* in Docket 14769, 27 Fed. Reg. 11698 (September 28, (1962)); *Report and Order*, 70 F.C.C. 2d 1176 (1978).

[62] *Report and Order*, 62 F.C.C. 2d 164 (1976).

[63] *"Comparability for UHF Television: A Preliminary Analysis"*, prepared as part of General Docket No. 78–391 and available from the National Technical Information Service, Springfield, Virginia, NTS No. PB 301267–AS. The report found three main areas of differences—channel selection (tuning), picture quality, and programming. It noted the potential of electronic tuning in the first area, and, in the second, new developments in receiving antennas and also a more efficient UHF transmitter which could reduce the tremendous (and costly) amounts of power which UHF stations now use just to produce a signal comparable in geographic reach to VHF stations having much lower power. The report concluded that differences in programming (largely reflecting UHF unwillingness or inability to pay high prices) will tend to disappear as technical differences continue to be reduced.

[64] This Report is available from the National Technical Information Service, Springfield, Virginia, NTS No. ——.

[65] *Further Notice of Inquiry and Notice of Proposed Rule Making* in General Docket No. 78–391, —— FR —— (——).

[66] A Louis Harris and Associates survey of UHF viewers conducted for the UHF Comparability Task Force included an objective test of reception of two UHF stations for each viewer interviewed; 75 percent to 69 percent of viewers who were within the Grade A contours of the UHF stations tested and who relied on indoor UHF antennas were able to receive the UHF stations. (*A Survey of Consumer Attitudes and Experience Regarding UHF Television*, Study No. 792–806, September 1980.) A higher percentage of viewers using outdoor UHF antennas received UHF stations. Approximately 75 percent of viewers within the A contours of these stations used outdoor or indoor UHF antennas. Of those who used no UHF antenna, 56 to 52 percent still were able to receive the UHF stations tested. The percent of viewers using at least an indoor UHF antenna may be expected to increase since the Commission in 1978, required, under the authority of the All-Channel Receiver Act, that all sets sold in interstate commerce with VHF attached antennas also must have UHF attached antennas (*Report and Order* in Docket No. 20839, 62 F.C.C. 2d 164 (1976)). Finally, a viewer without a UHF indoor antenna could, at a cost of under $10, buy one in order to sample UHF programming.

[67] For more detail about the program supply market, *see* Staff report on: *An Analysis of Television Program Production, Acquisition and Distribution* (Preliminary Report), Network Inquiry Special Staff, Federal Communications Commission (June 1980).

The likelihood that a viewer is now able to receive programming on UHF television no longer depends on the nonavailability of three VHF channels to carry the three networks. Receivers now automatically have the technical capability to receive UHF and alternative programming fare exists. Thus, it no longer appears that adding VHF service in the near term will lead, through adverse impact on the UHF television service as a whole, to reduction in the total amount of television service available to viewers in the long term. Rather, UHF is now sufficiently mature and viable to compete directly against VHF competition on the basis of its ability to provide programming of superior interest to the viewing public.

61. Accordingly, as we view the current situation, our duty is to open the way to more service by providing opportunities for it in the form of additional television channels, in accordance with the mandate of Section 303(g) of the Act to further "the larger and more effective use of radio. As the Commission stated in *Channel Assignment at Glendive, Montana*, FCC 69–183, 15 R.R. 2d 1559 (1966):

> When there is under consideration a proposed action which would permit the addition of an additional broadcast service to a community and area . . . we believe that there must necessarily be a presumption that the action should be taken. Otherwise we run the risk of thwarting the mandate of Section 303(g) of the Communications Act, which adjures the Commission to further the larger and more effective use of radio. This presumption is of course subject to rebuttal; but it is nonetheless a substantial one * * * As we stated in the *Dickinson, North Dakota* decision * * * we should be slow to act in a manner which would thwart the development of competition. 15 R.R. 2d at 1564 (1966), *supra*.

62. Basically, now that UHF–TV has achieved a *reasonable* degree of viability, it should be left to the market place to determine whether new service comes from VHF or UHF. A prospective broadcaster who wishes to offer a service to a market would be free to compare the costs and revenue potential of a full-coverage UHF allotment with a limited facility VHF allotment and choose which would be most effective for his service were the Commission ultimately to adopt these proposed rules. To achieve full coverage using the UHF allotment would cost more for power and equipment, but the operator would be free to cover the entire market with the signal, unlike the limited facility VHF allotment.[68]

63. Finally, it also most be borne in mind that the policy of "UHF Impact" protects against new VHF competition not only actual or potential UHF stations but also existing *VHF* stations—those in the same market where the limited facility VHF allotment would be located. Thus, in *Jefferson Pilot Broadcasting Co.*, 42 F.C.C. 2d 908 (1973), the "UHF Impact" was on potential use of the Greensboro, North Carolina UHF allotment (a station operating on it had recently gone dark), but the immediate beneficiaries of the policy's application were the three VHF stations in the market that includes Greensboro.[69] this aspect of this policy is undesirable in any event, since it limits the availability of alternative program sources and competition, and affords protection to entities that do not need it.

VI. The Proposed Procedure for Adding New Allotments to the VHF Television Table

64. The preceeding discussion in Sections II through V sets forth why increased potential VHF television service is in the public interest, e.g., satifaction of unmet demand for more television service by viewers as well as prospective broadcasters and promotion of the first amendment principles, by increasing diversity of voices and competition. That discussion also recites the history of Commission actions aimed toward improving television service to the public. The history reflects an evolutionary approach by the Commission in this area. As will be explained in this section, this evolutionary process has brought the Commission to the point where the next incremental developoment of the legal and policy precedent makes possible an opportunity for significant expansion of television service. There are three basic areas where we are proposing changes:[70] (1) A presumption that the new service from a new station is a benefit exclusive of other considerations; (2) the general allotment rulemaking process by which short-spaced VHF television allotments are made, and (3) how any alleged adverse impact on UHF television service is considered in the overall allotment rulemaking process.[71] Our proposed changes in the general allotment rulemaking process for VHF will be addressed first.

General Proposals Involving New VHF Allotments

65. Under the rules in existence today, if a prospective broadcaster requests a television channel allotment not presently specified in the Table, his petition falls into one of two categories under existing FCC procedures. If it is possible to fit an allotment into the selected principal community in conformity with the minimum cochannel and adjacent channel mileage separation distances, the petitioner's task is relatively straight forward. Once it is established that the standard spacing requirements can be met, the Commission issues a notice of proposed rulemaking (NPRM) to amend the Table to add the new allotment. During the comment period of this NPRM, parties opposing the new allotment can introduce evidence which they believe show why the addition of the new allotment is not in the public interest. Proponents of the new allotment can file reply comments supporting the addition of the allotment or rebuting the adverse comments. If there are no opposing comments filed, the rule amendment to the Table is adopted as a matter of course, given the obvious benefit the new service to the public that would result.

66. If there is opposition to the new standard spaced allotment, the Commission weighs the evidence on both sides and denies the proposed new allotment only if the result of granting it would be a net loss of service to the public. In this type of proceeding those filing in opposition to the new station have the burden of introducing evidence to contradict the obvious public interest benefit of the added service the new allotment would bring. The opponents of the proposed standard spaced allotment also have the burden of proving that the presumption in favor of an additional allotment is unwarranted in the particular community under the high standard of the *Carroll* doctrine (proof that losses of existing service will

[68] Indeed, there may be situations where "drop-in" VHF stations go on the air before vacant UHF allotments in the same markets are applied for. This obviously would be a reflection of the continued perceived gap in comparability between UHF and VHF stations. While this demonstrates the need to pursue vigorously technical improvements in UHF television, *see* paragraph 55, *supra*, it is difficult to find how the public interest would be served by depriving viewers in a given market of immediate additional service merely because it comes from a VHF rather than a UHF station

[69] Two of them were the objecting parties.

[70] It should be noted that the changes referred to at this point are exclusive of the technical modifications set forth in Sections VII and IX.

[71] It is proposed that these changes not apply to applications for changes in existing VHF television stations. Those situations do not offer the same degree of potential for new service, a fundamental basis for the action proposed here, and, consequently, should continue to be determined under the existing approach.

outweigh the service gains).[72] We note that the impact of proposed VHF allotments on vacant VHF allotments is not considered in these service gain and loss calculations. For example, if the addition of the allotment to city A brings new service to both city A and nearby smaller city B, the availability of a vacant VHF allotment in city B that potentially could have served the two cities but has not yet begun to do so is never a basis for refusing the allotment to city A.

67. Under current rules, if it is not possible to fit in a standard spaced allotment into the selected principal community, the prospective broadcaster can request that the rule requiring that the specified minimum, mileage separation distances be waived and that a short spaced allotment be granted. Such an allotment could then be applied for by a station using reduced effective radiated power and reduced antenna height—a limited facility station (LFS). Under this waiver procedure, the proponent of the new service has both the burden of coming forward with evidence showing why a waiver of the rule would be in the public interest, and the ultimate burden of proving that a grant of the waiver would serve the public interest, convenience and necessity. In waiver situations this burden is always a heavy one.[73]

68. Under the new proposal, if the required equivalent protection formula is met, the proposed allotment would now be treated in the same manner as, under current rules, we treat petitions for new, standard spaced allotments. Initially, the proposed allotment would be presumed to be in the public interest. But this presumption would not be irrebutable. Any interested party could attempt to demonstrate in the rulemaking proceeding to add a new allotment that the proposed new service is not in the public interest. While we propose to presume that the gain of service to the public that will result from the addition of a new VHF station will in most circumstances outweigh any "lost" service because of interference created by the added station, any interested party will have the opportunity to show that, because of increased interference the public interest would best be served by rejection of the petition to add the new station. But the burden of coming forward with sufficient evidence and the burden of proving that the clear benefits of added service that would result from any new channel allotment are outweighed by increased interference would be a heavy one.[74] The practical effect of this procedural change would be to permit the addition of new, LFS VHF television allotments to the Table in much the same way that standard spaced allotments are now added.

Comments Related to UHF Impact

69. In our decision in *WFMY Inc.*, 59 F.C.C. 2d 1010 (1976), the Commission was confronted with claims of adverse impact on potential and existing UHF stations as a result of an application by a VHF station to modify its facilities to increase its coverage. In repudiating its past practice concerning determination of the UHF impact issue, the Commission stated that "[W]e simply do not believe that the public interest is served by forswearing indefinitely the benefit of additional VHF service while awaiting the germination of dormant interest in an idle UHF allocation." 59 F.C.C. 2d at 1016 (1976). The Commission explained that while the applicant for VHF facilities bears the ultimate burden of proving that a grant of the application would be in the public interest, the burden of demonstrating at the threshold the existence of substantial adverse impact to the opportunity for UHF service must be carried by the party alleging adverse impact. Moreover, the Commission modified its approach whereby it would weight the benefits of improved VHF service against adverse competitive impact on UHF only in cases where the adverse impact was already determined to be "minimal." In *WFMY Inc.*, the Commission recognized "that UHF broadcasting has advanced to the point where a much more 'substantial' impact can be tolerated without disservice, overall, to the total public interest." 59 F.C.C. 2d at 1017 (1976). Therefore, the Commission held that regardless of the characterization of the impact on UHF—whether "substantial" or "minimal"—the VHF applicant would be permitted to demonstrate by countervailing evidence, that, overall, the weight of the public interest favors a grant of the application." *Id.*

70. In this proceeding, we propose to extend the "substantial adverse impact" policy announced in *WFMY Inc.* generally to all new proposals for short-spaced VHF allotments. As set forth in Section V, *supra*, we have carefully scrutinized the current viability of the UHF television service and considered its ability to continue to provide service to the American public in the future. We have concluded that generally the potential negative impact on UHF service from additional VHF service is limited and far outweighed by the benefit to the public from additional UHF service.[75] Consequently, we are proposing that we will not consider in allotment proceedings for new VHF stations the potential effect of the proposed VHF service on vacant UHF allocations. To repeat again what we concluded in *WFMY Inc.*: "We simply do not believe that the public interest is served by forswearing indefinitely the

[72] Since the "loss" to be shown under the *Carroll* doctrine is *actual*, rather than theoretical loss of service we propose that opponents to the new allotments who base their objections on predicted cochannel interference must take into account the availability of precise carrier frequency offset equipment, discussed in detail at paragraphs 117 to 121, *infra*, and front-to-back ratios of typical home roof top antennas, discussed in detail at paragraphs 103 to 108, *infra*, in calculating predictions of interference losses.

[73] One example of what is involved is the recently completed proceedings in Docket No. 20418; a proceeding which ultimately resulted in four waiver requests being granted. The successful petitioners had to show that: (1) The principal community to be served was one of the top 100 markets; (2) they provided a grade A signal to the city of license; (3) antenna sites were available; (4) that the proposed allotments would not be more than 17.65% short spaced to other allotments in the table; (5) they were not short spaced to Mexico or Canada; (6) existing UHF stations would not be substantially harmed; (7) they were not in an all UHF market or would not provide substantially the same service as an existing UHF station; and, (8) a net service gain to the public was likely. In addition, they were called on to rebut evidence that: (1) the proposed markets would not support an additional station; (2) antenna orientation problems would prevent acceptable service to the principal community; (3) a complement of three networks, one educational and one independent was adequate service; (4) the utilization of vacant UHF channels was a better means of providing for additional service; (5) the move towards a demand system of allotments would be costly and complex; (6) any VHF drop-ins at all would have a psychologically negative impact on UHF television general; and, (7) they would cause unacceptable interference.

[74] Under our proposal, we do not envision that objections to loss of service because of interference created by a new station would be considered in the license assignment proceeding. The most appropriate time to raise such objections is during the allotment proceeding where these claims can be considered in the context of the allotment decision. Unless a party were to come forward with some newly discovered evidence which for good reason was not available at the time of the allotment proceeding or otherwise demonstrate good cause, we do not contemplate that "gain" versus "loss" issues will be considered again in an assignment proceeding to determine if an application for the allotment should be granted. Agencies, like courts, apply the doctrines of *res judicata* and collateral estoppel to administrative proceedings in order to promote efficiency and finality in agency decisionmaking. The Supreme Court has specifically approved the application of *res judicata* to agency proceedings. *United States v. Utah Construction and Mining Co.*, 384 U.S. 394, 422 (1966). The FCC has applied both the doctrines of *res judicata* and collateral estoppel to its own proceedings with the approval of the courts. *Gordon County Broadcasting Co. v. FCC*, 446 F.2d 1335, 1338 (D.C. Cir. 1971); *Sayger v. FCC*, 312 F.2d 352, 356 (D.C. Cir. 1962); *Tomah-Mauston Broadcasting Co. v. FCC*, 308 F.2d 811, 813 (D.C. Cir. 1962).

[75] See Section II, *supra*, for a discussion of the public interest benefits of additional television service.

benefit of additional service, while awaiting the germination of dormant interest in an idle UHF allocation." 59 F.C.C. 2d at 1016. If the record before us supports the view that there is a large unfulfilled present demand for television service which could be met by prompt initiation of additional VHF service, we do not believe the public interest would be served by consideration of potential impact on UHF allocations which have remained unapplied for to this time. We are soliciting comment concerning whether consideration of potential impact on idle allocations should be foreclosed in cases where applications for those UHF channels are pending or only in those cases for which no applications have been filed.

71. With respect to the impact on existing UHF stations from additional VHF allotments, we do not propose to foreclose consideration of such impact in the rulemaking proceeding proposing a new allotment. While any interested party will have the opportunity in the allotment proceeding to contend that the impact of the proposed VHF allotment on existing UHF service is sufficient to warrant denial of the allotment, the burden of proving that the UHF impact outweighs the stong public interest in additional television service will be particularly heavy. Under the *Carroll* doctrine,[76] the Commission presently is required to consider claims that the public interest would be harmed by actual loss of existing service caused by authorization of new service. Thus, we propose now to consider claims of adverse impact to existing UHF service from new VHF allotments as we would consider under the *Carroll* doctrine claims of adverse impact to any existing broadcast service. But, as the Court emphasized in *Carroll*, the party claiming adverse impact as a result of additional service bears the burden of proving the adverse impact—"and it is certainly a heavy burden." 258 F. 2d at 444. It is entirely appropriate for the party claiming such adverse impact to bear such a heavy burden because as the court in *Carroll* noted, "[c]ompetitors may severely injure each other to the great benefit of the public." *Id.* at 443.[77]

72. The approach we are proposing for consideration of UHF impact would represent only an evolutionary extension of the Commission's *WFMY Inc.* decision. By utilizing this rulemaking to make well-supported findings concerning the public interest benefit in authorizing the prompt initiation of additional VHF service rather than foreclosing such service while awaiting perhaps for many years some potential unrealized UHF service, the Commission will be able to avoid the lengthy delays that would be required to authorize additional service under the present system.

73. The Commission's recent decision to add short-spaced VHF allotments in four cities[78] represented the first application of the *WMFY* policy to a VHF drop-in. Based on the same technical criteria that underlie the proposals before us today, a strong public interest justification was made for the four allotments. The events in those four instances however, illustrates a major weakness of current policy that today's proposal could remedy. *See* note 73, *supra*. The proposed rule changes before us today would alleviate the situation where petitioners expend huge sums of money on allotment proceedings and yet never gain consideration for assignment.

74. The rule changes we are proposing today, while a small change from past practices are, we believe, of extreme importance to the public because of the benefits that should result from their implementation. Specifically, the proposed rule changes should result in a significant amount of new television service. This service will be in response to actual, immediate demand for that service, as identified by the potential broadcasters and others who will prosecute the petitions to add these news allotments to the Table. Thus, the remaining VHF television spectrum capacity will be put to use satisfying real needs, as opposed to being held idle, thus increasing the efficiency of spectrum use in accordance with Section 303(g) of the Communications Act.[79]

VII. Background Technical Information

75. The following discussion of the technical side of our proposal is best understood if proceeded by a brief review of the conceptual basis of the Table and the underlying phenomena of television signal propagation, service contours, and interference. The reader is cautioned that for the sake of clarity (and brevity) we have omitted what we believe to be unnecessary details.

76. Using the extensive data accumulated as a result of its long deliberation up until that point, the Commission adopted a scheme of standard separation distances and the Table in the *Sixth Report and Order, supra*. Three important factors in that decision are also crucial to our decision today. First, having developed a set of field strength propagation curves (a mathematical model that predicts how strong a television station's signal is at various distances from the station), the Commission selected cochannel (i.e. stations on the same frequency) and adjacent channel (i.e. stations one channel higher or lower than the subject channel) separation distances that resulted in a predicted amount of interference to viewers near the edge of each station's service area. The distances chosen represented a trade off between a desire to have stations tightly packed together, to provide as many channels as possible in the major population centers, and a desire to have the stations far enough apart to permit reception of their signal in sparsely populated areas well outside the urban centers. As is explained in paragraph 97, *infra*, the level of interference selected by the Commission in this decision will be preserved by the rule changes proposed today, but the separation distances used to implement them will be replaced with a system of reducing effective radiated power in the direction of the existing station commensurate with the reduction in mileage separation between the stations.

77. Second, the Commission limited the maximum output power allowed and selected conservative (i.e. extra far apart) separation distances to ensure that the future addition of stations in more sparsely settled areas of the country (e.g. outside of Zone I) did not deny rural viewers the little service they then received.[80] Given the situation then facing the Commission (in 1952 most of these rural viewers had at most only one viewable program source), this cautious protection of each station's fringe service areas was well justified. This situation has changed substantially.

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[76] *Carroll Broadcasting Co.* v. *F.C.C.*, 103 D.C. App. 346, 258 F. 2d 440 (1958).

[77] Again, as with consideration of traditional "gain" versus "loss" issues, we do not contemplate that impact on viewers on existing UHF stations will be considered in assignment proceedings. Any party wishing to contend that new VHF service should not be authorized because of UHF impact should do so in the allotment proceeding, and it is not in the public interest to relitigate the same issue during the assignment proceeding absent the proffer of newly discovered evidence which for good reason, was not available at the time of the allotment proceeding or other good cause. For a discussion of the application of the principle of *res judicata* and collateral estoppel to agency proceedings, *see* note 74 *supra*.

[78] Report and Order in Docket No. 20418, FR (October , 1980).

[79] Although the Commission has no direct statutory mandate to protect the economic well being of television broadcasters, VHF or UHF, we must be concerned if the impact of a proposed new service on existing broadcast stations is so severe that a real and significant decrease in the amount of service reaching the public can be demonstrated. *See Carroll Broadcasting Co.* v. *F.C.C.*, 258 F. 2d 440 (D.C. Cir. 1958).

[80] *Sixth Report and Order*, 41 F.C.C. 148 at para. 111 (1952).

Most rural Americans now receive signals from four or five different stations, rather than zero or one. Alternative video delivery systems such as cable television make the loss of a particular over-the-air signal less significant. Also, the maturation of home rooftop antenna technology to provide a more consistently high quality antenna means that today rural viewers are now more likely to employ a receiving antenna superior to their 1952 counterpart. Furthermore, recent advances in television reception technology may result in the availability of even better reception systems before the effect of the proposed rule changes occurs.

78. Third, in the *Sixth Report and Order* the Commission decided not to take advantage of several recognized ways of placing stations more closely together. It chose instead to reserve these possibilities as "safety factors" that would resolve future problems if the newly developed propagation curves proved to be overly optimistic and a large amount of unexpected interference resulted. This margin of error was provided by not taking into account the effects of terrain shielding (i.e. the presence of high mountain and rough terrain causing the station's signal to decrease in strength more rapidly than the propagation curves predict), precise frequency control (i.e. controlling the carrier frequency of the trnsmitter with an extremely high degree of accuracy, resulting in a lessening of the cochannel interference effects), and receiver antenna front-to-back characteristics (i.e. a characteristic of typical rooftop television antennas that results in their receiving a signal arriving from the front much better than another signal arriving from the rear).[81]

79. The Commission faces a very different situation today than in 1952. The VHF portion of the Table is virtually saturated and over 600 VHF stations are on the air, yet problems of television co-channel interference have been minimal. The propagation curves, amended twice since 1952, have proved to yield reasonably accurate predictions of service area. Technological advances have made the accurate control of transmitter frequency widespread. As the use of precise frequency control technology has spread, its cost has declined. And, as mentioned above, home receiver antennas have been standardized on a few superior performing configurations so that front-to-back ratio of at least 12 dB [82] on any channel in the VHF band are the norm and more expensive antennas with 20 or 25 dB front to back ratios are available to resolve special reception problems. Only the terrain shielding effect is not yet amenable to precise quantification, and therefore not available as a tool to configure more efficiently the placement of future VHF station allotments. Given this greater understanding of these phenomena, and the greater availability of this improved equipment (plus the advent of computer calculation capabilities) the Commission is now in a position to reassess its decision to limit interference between television stations by means of fixed mileage separation distance.

Table of (Television Channel Allotments).

80. The Commission sought to obtain a suitable balance among several objectives in its *Sixth Report and Order*—wide area service by each station, multiple service in populous areas, and an equitable distribution of stations throughout the country. To help accomplish these goals, it developed a set of parameters it called "planning factors." The planning factors described different technical characteristics of the television delivery system that determine when and where service can be expected when different arrangements of transmitter and receiver equipment are employed in the system. The receiving antenna front-to-back ratio and the propagation curves mentioned above are two of the planning factors then relied upon by the Commission. The height of the receiving antenna, the amount of co-channel interference acceptable, the amount of adjacent channel interference acceptable, the "selectivity" of the "typical" receiver (how well the average receiver picks out a desired signal from other unwanted signals on nearly the same frequency), the receiver noise figure (a measure of how much "snow" is added to the television picture by the home receiver), and the transmitter output power, antenna pattern, and antenna height, are some of the other planning factors quantified by the Commission as part of these deliberations.

81. The Commission was confronted with a situation involving hundreds of applicants requesting channels in hundreds of cities, all wishing to begin construction and operation as soon as the Commission lifted its "freeze" on further licenses. Which cities could be served depended on a combination of variable factors including what transmitter power and antenna height was selected and the distance to other cochannel and adjacent channel stations. Both to resolve the administrative nightmare of selecting the location and characteristics of so many different stations, and to ensure that service was equitably divided among different cities and between urban and rural areas, the Commission set about its task by fixing exact values on each of the technical planning factors. All rooftop antennas were assumed to be exactly 30 feet above the ground. All terrain was assumed to consist of gently rolling hills. All receiving antennas were assumed to have no front-to-back ratio. Maximum transmitting antenna height and output powers were specified for different parts of the television bands and different parts of the country. Stations were assumed to be operating at these maximum output powers and antenna heights. All receivers were assumed to have at least a certain selectivity and noise figure, and so forth. The result of these fixed assumptions was to define a minimum distance at which two cochannel or adjacent channel stations could be placed and still meet all the planning assumptions.

82. The Commission than distributed these stations among the existing cities in a scheme it called the "Table of Assignments" (now, Table of Television Channel Allotments). Two important decisions resulted in the Table being configured as it is today. First, by selecting prescribed cochannel and adjacent channel desired-to-undesired signal ratios at 28 dB and 0 dB respectively the Commission determined that each station's service area would be interference limited in the direction of adjoining stations in the Table. In other words, the Commission selected a mix of noise-limited and interference limited television service as the vehicle likely to maximize service to the public.

83. Second, and more important to the discussion at hand, the Commission selected a system of maximum antenna heights and transmitter power and incorporated an assumption that all stations would operate with these maximum facilities. Given the above described maximum permissible levels of co-channel and adjacent channel desired-to-undesired signal ratios, station allotments had to be spaced at certain minimum distances in order to operate with these assumed maximum facilities. These minimum spacing requirements were then incorporated in the rules, thereby insuring that the prescribed desired-to-undesired signal ratios were preserved whenever stations wer added to the Table. The assumption that all stations would operate with the maximum-permitted facilities is critical.

[81] *See* note 106 *infra.*
[82] *See* paragraph 108. *infra.*

Stations operating with less-than-maximum facilities could maintain the prescribed desired-to-undesired ratio (i.e. cause no more interference than planned on by the *Sixth Report and Order*) and could be spaced at less than the minimum distances currently specified in the rules. In other words, the Commission decided in its *Sixth Report and Order* to limit the amount of interference by assuming a certain uniform effective radiated power and then prescribing fixed station separation distances accordingly.

84. An equally valid means of achieving the same objective—to ensure that no more than the prescribed levels of interference are created—would be to allow station allotments at variable distances, but to vary the stations' effective radiated power such that the permitted desired-to-undesired signal ratios between each pair of co-channel and adjacent channel stations are not exceeded. This would provide existing stations with protection from interference that is equivalent to the protection accomplished by the standard mileage separation distances in the Rules. Because the Commission was faced with many hundreds of prospective applicants and because extensive hand calculations were necessary to specify individual limits for each station's effective radiated power, the administrative burden of adopting this case-by-case engineering approach would have resulted in extremely long delays in getting this "new" service to the public. The Commission was thus quite reasonable in adopting the simplifying assumption that all stations should be assumed to employ the same transmitter facilities. The system selected worked well. Over 600 VHF stations have come on the air. And most of them have, in fact, selected close to the maximum permitted facilities. Today, however, few additional stations can be squeezed into the Table with transmitter power outputs at the maximum level; certainly no more stations could be added to any of the larger television markets.

85. Given the present circumstances—more information on home receiver antennas, a saturated VHF Table, computer technology with which to calculate more expeditiously individual station characteristics, and thirty years of experience with the effects of adding stations at distances predicted to cause the maximum permitted amount of interference—we believe the time has come to reexamine the decision that all stations should be assumed to operate with the maximum specified facilities. The grid of VHF stations that has developed contains numerous spaces too small to fit maximum facility stations, but large enough to place more limited facility stations (LFS) which, given appropriate restrictions on their radiated powers would not exceed the desired-to-undesired cochannel and adjacent ratios assumed as planning factors by the *Sixth Report and Order*. It is the means of accomplishing this which we now wish to explore.

Multiple Interference

86. The question of multiple (in the sense of cumulative or additive) interference was addressed in the *Third Notice* and repeated in paragraph 180 of the *Sixth Report and Order supra*. The Commission concluded that the effect of two interfering co-channel stations was no worse than the effect of each treated separately. That is, given the geometry of a situation where three stations are all located at minimum separations with respect to one another, and where directional receiving antennas are employed, the interference at any point within a Grade B contour should be no worse than that which would be caused by a single undesired signal. 41 F.C.C. at 203 (1952).

87. In this proposal the possibility exists that two undesired stations may be closer together than would otherwise be permitted with fixed minimum spacings. This creates a mathematical possibility of interference slightly greater than would be caused by either station alone. We are persuaded, however, that the likelihood of measureable harm is insignificant, for these reasons:

1. First, the effect of two interfering signals is not directly additive. The worst case of two equal interfering signals raises the level of received interference approximately 3 dB. This causes a reduction in the quality of service of less than ½ TASO grade or, alternatively, a reduction in the radius of the interference-limited contour by, at worse, about 4 miles.[83]

2. Second as the likelihood of an LFS causing multiple or cumulative interference increases, the attractiveness of such an LFS allotment decreases. In any situation where an LFS is capable of causing additive interference, the geometry of its placement will result in it also receiving interference from the equivalent of two full-powered stations. In such a case, the LFS will have been required to reduce its effective radiated power in two directions, rather than the one normally contemplated. The result should be an unusably small service area.

3. Third, we will deny any proposal in which it appears that the costs clearly do outweigh the benefits. Anomalous situations, if they arise, will be dealt with individually, as part of the rule making proceeding adding the LFS allotment.

Coverage

88. Although an LFS is required to reduce its radiated power in the direction of a co-channel adjoining station, the effect on its predicted coverage is not so extreme as to make the allotment worthless. For example, in the case of a channel 10 station operating in Zone I at a short spacing of only 106 miles, its estimated Grade B coverage is approximately 2,800 square miles. If the spacing were increased to 122 miles, the coverage would exceed 7,100 square miles. Both are enough to serve urban, suburban and rural areas. If the effects of home rooftop antenna front-to-back ratios and the use of precise frequency offset are taken into account, the possible service areas of these LFS' for spacings of 106 and 122 miles would be approximately 5,400 and 8,200 square miles respectively. Of course if there is any question as to the coverage of a potential station—say, because of rough terrain—an enterpreneur can choose to make preliminary measurements for his own analysis before applying for an allotment.

Probabilities and Uncertainty

89. In considering calculations based on the propagation curves, we consider it instructive to refer to a remark made in the *Third Notice* and repeated in paragraph 85 of the *Sixth Report and Order:*

> * * * the propagation charts are sufficient to afford an adequate statistical basis for describing field intensities *under average conditions,* but it is expected that there may be substantial variations in individual areas. [emphasis added]

Because of these expected but unpredictable variations the Commission, in 1952, selected minimum separation criteria which erred, if at all, on the side minimizing unacceptable interference. 41 F.C.C. 148 at paragraph 113 (1952). Since the notion of equivalent protection is based on the propagation curves and separation criteria, the safety factor inherent in the original

[83] While it is difficult to quantify the impact of noise on the quality of reception, one group—a panel of the Television Allocations Study Organization (TASO)—conducted studies which found that increasing the signal to noise ratio by 4 dB would cause roughly one-third of all television viewers to raise their description of picture quality by one "TASO grade." TASO grades are labeled "unusable", "inferior", "marginal", "passable", "fine" and "excellent." Charles E. Dean, "Measurements of the Subjective Effects of Interference in Television Reception," 48 *Proceedings of the IRE* 1042 (June 1960), Figure 8. This estimate was obtained as follows. For each TASO grade the percentage of observers classifying a picture as that TASO grade was determined for ± 2 dB around the median observer. The differences were then averaged across all six TASO grades.

spacings is preserved in our current proposal. Furthermore, developments in home receiving antennas add a much greater margin of safety than was possible in 1952. Lastly, and this is one additional point that is all too easy to overlook, the station separation criteria have been in use for almost 3 decades. In the interim numerous VHF stations have been added to the existing system. In over forty of these instances short spacing to another station was involved. Nevertheless, a general review of our records of interference complaints and a detailed review in the six shortest spaced cases uncovered no pattern of service interruption or consumer reports of increased objectionable interference. With the advantage of hindsight we may conclude that the original criteria were correct, if not overly conservative, and that confidence is warranted in calculations based on those standards. We do not deny that it is possible to find situations in which our current propagation curves may not apply, but we do assert that such instances are not so common as to cast doubt on the validity of the present proposal and can be treated on a case-by-case basis.

VIII. Technical Proposals

90. The strength of a television signal more than a few miles from the transmitting antenna cannot be predicted with a high degree of certainty. The field strength of a television signal at any particular point is a function of effective radiated power, antenna height above average terrain, frequency and distance from the transmitting antenna. The signal also varies with time and location because of atmospheric and terrain effects. To describe such a signal properly we find that we must resort to statistics, using terms based on median values of field strength (i.e., signal strength) exceeded at a given percentage of locations for a given percentage of time. We can use standard statistical methods to describe these variations so as to predict the strength of the signal within certain calculated confidence limits. The notation F(L,T) means the value of field strength equaled or exceeded at L% of the receiving locations for T% of the time or better.

91. Estimates of the variation of signal strength with distance are obtained from curves contained in the Commission's rules. These curves were derived from many measurements on different stations under varying conditions and therefore represent average values; they are intended for allocation purposes and general studies and will likely prove inaccurate in individual cases that deviate significantly from the norm.[84] The Commission has officially adopted two sets of curves, called the F(50,50) and F(50,10) curves. For a given channel, radiated power, transmitting antenna height and distance, the F(50,50) curves predict the value of field strength that should be equaled or exceeded at 50% of the potential receiving locations for 50% of the time, when measured at a height of 30 feet. The F(50,10) curves are similar except that they predict the value of field strength equaled or exceeded 10% of the time. For convenience in calculations, the field strengths predicted by the F(50,50) and F(50,150) curves are expressed as logarithmic ratios in decibels (dB) above a reference field strength of one microvolt per meter. This unit of field strength is commonly abbreviated dBu.

92. The rules define two service contours that relate to two grades of service. Grade A service is a signal capable of providing an acceptable picture at least 90% of the time at the best 70% of receiving locations, in the absence of interference from other stations. Grade B service is a signal capable of providing an acceptable picture at least 90% of the time at the best 50% of receiving locations, also in the absence of interference from other stations. Both types of service are "noise limited" in that they ultimately are limited by natural or man-made electrical noise.

93. The Grade A and B contours represent the outer limits within which the population, taken as a whole, receives that particular grade of service, or better. These contours are depicted in figures 1(a) and 1(b), which also show their relationship to a propagation curve. The example is based on a station operating on channel 8 in Zone I with an effective radiated power of 25 dBk[85] and an antenna height of 1,000 feet.

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[84] To avoid any misperception on the part of television service licensees, the F.C.C. Rules contain an explicit provision to make it clear that the definition of these field strength contours are not for the purpose of defining a protecte service area. Rather, a television station's theoretical service area is defined in terms of whatever service area results when it operates in the presence ot co- and adjacent channel stations operating with maximum antenna height and power at the minimum separation distances in the rules (a) service area that would not be reduced as a result of the equivalent protection criteria proposed today). To wit: "Permittees and licesees of television boradcast stations are not protected from interference which may be caused by the grant of a new station or of authority to modify the facilities of a existing station in accordance with the provisions of this subpart. The nature and extent of protection from interference accorded to television broadcast stations is limited solely to the protection which results from the minimum (allotment) and station separation requirements and the rules and regulations with respect to maximum powers and antenna heights set forth in this subpart." Sec.§ 73.612(a) of the rules, 47 CFR § 73.612(a) (1978).

[85] 25 dBk is 25 decibels above one kilowatt, or 316 kilowatts. The antenna height is actually height above-average-terrain (HAAT).

FIGURE 1 (a)

Decrease of Signal Strength with Distance

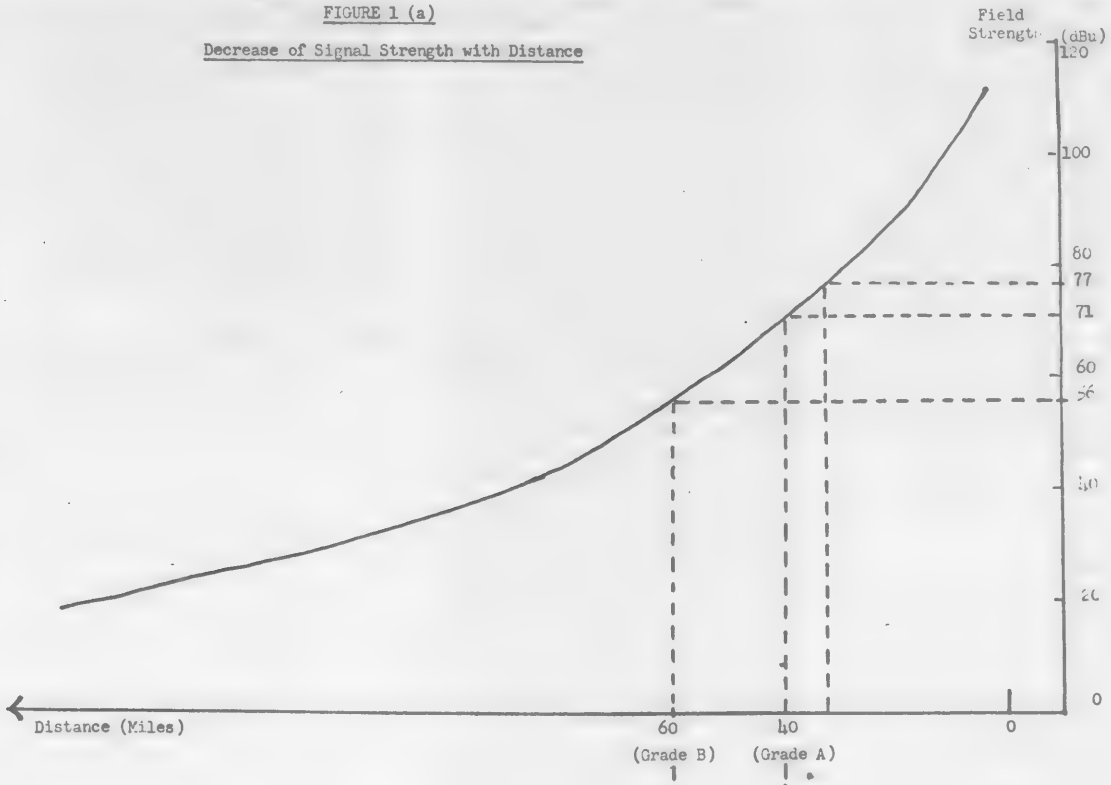
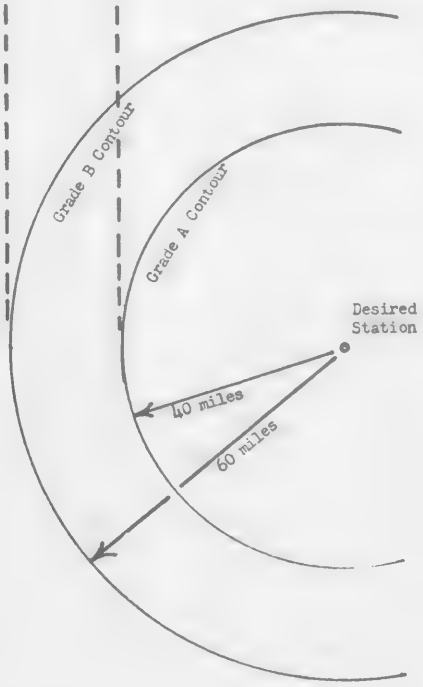


FIGURE 1 (b)

A Plan View of Grade A and B Contours



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94. A television station that operates sufficiently close to another station on the same channel (co-channel) will interfere with that other station's signal. The point at which this interference becomes significant depends both on the relative magnitude of the two signals and their frequency relationship. The relative magnitude is commonly expressed as a ratio (in decibels) of the desired (D) to the undesired (U) signal, where the desired signal is calculated from the F(50,50) curves and the undesired signal from the F(50,10) curves. The term "frequency relationship" applies to the visual carriers of the two signals and whether they are on the same frequency (non-offset), by 10 ± 1kHz (offset) or offset by 10,010 ± .005 kHz (precise offset).[86] In the *Sixth Report and Order* the Commission accepted the following D/U ratios as permissible for Grade B service:

Non-offset, 45 dB; and
Offset, 28 dB.

These values should result in a picture in which the interference is perceptible but not objectionable.

95. Interference can also arise when two stations operate near one another on immediately adjacent channels. In the case of adjacent channel interference, the D/U ratio needed to provide equivalent protection from adjacent channel interference is −6 dB and −12 dB for the upper adjacent channel.[87] We propose, however, to use OdB as the appropriate planning factor in either case with both the desired and undesired signals calculated from the F(50,50) curves. We are not proposing to incorporate the revised values (−6 and −12dB) into our equivalent protection criteria for a variety of reasons. First, the incorporation of these lower adjacent channel protection ratios would allow an existing or a new VHF station to come several miles closer to an existing VHF station without any reduction of its effective radiated power below the maximum. The implications of this possibility have not been sufficiently explored to warrant proposing such a change at this time. Second, our analysis of the adjacent channel interference question was premised on substitution of new service for old service up to the OdB point between the two stations (equidistant between them for two full power stations). If, at this equidistant point, the lower protection ratios are used to determine the amount of protection, an existing station would enjoy a smaller protected service area than it would receive using the old, more conservative OdB adjacent channel protection ratio. Since we are preserving the existing protection levels as much as possible while making the proposed changes, continued use of the admittedly antiquated planning factor seems appropriate. Third, by retaining the OdB adjacent channel protection ratio we space adjacent channel stations such that viewers in a large area experience the addition of the new station without a loss of the existing service. This benefit mitigates, somewhat, the lost benefits from not using the spectrum in the absolutely most intensive manner. Lastly, new receiver technology is on the horizon that may permit the Commission to do away with the adjacent channel separation distances altogether. If this capability reaches the marketplace sufficiently quickly, the whole system of adjacent channel separation distances will have to be revised in a much more comprehensive manner in the future in any case. In that context, an incremental adjustment now may cause more disruption than its long term usefulness justifies.

96. Although neither the co-channel nor adjacent channel ratios were incorporated in the Rules, they were employed by the Commission in establishing power, height and spacing standards adopted in the *Sixth Report and Order*. Thus, the Commission intentionally defined an acceptable level of co-channel and adjacent channel interference when it set up the minimum station separation distances used in the Table.[88] Under our current rules co-channel stations are permitted to operate at minimum distance separation provided their carriers are offset. The result of this is to create a crescent-shaped area between the Grade A and Grade B contours within which the theoretical interference becomes progressively more objectionable. By "objectionable" we mean interference that degrades the picture quality observed by the typical viewer sufficiently, in enough locations, enough of the time, that "Grade B" service is no longer received. This situation is illustrated in figures 2(a) and 2(b). The shaded area theoretically no longer receives Grade B service.

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[86] If the visual carrier frequencies are separated by less than about 0.50 to 0.1 Hz or less, the required protection ratio appears to be approximately 28 dB. A new station could achieve this "zero offset" condition (± 0.1 Hz) either by having both it and the affected co-channel station use very precise frequency standards or by phase locking the new carrier to the carrier frequency of the existing station. When two stations achieve zero offset they are said to have "synchronous carriers." *See A Review of the Technical Planning Factors for VHF Television Service*, Gary S. Kalagian, FCC/OST/RS 77-01, at Appendix E (1977), National Technical Information Service No. 266341.

[87] The adjacent channel ratio is lower than the value assumed in the *Sixth Report and Order* to reflect changes in television receivers that have taken place in the thirty years since that action. *See A Review of the Technical Planning Factors for VHF Television Service*, Gary S. Kalagian, FCC/OST/RS 77-01, (1977), National Technical Information Service No. 266341.

[88] *See Notice of Proposed Rule Making* in Docket No. 20418, 63 F.C.C. 2d 480 at paragraph 55 (1977). Although the Commission cited these "permissible co- and adjacent channel levels" in the *Sixth Report and Order* (41 F.C.C. at 177), it concluded that their inclusion in the rules was unnessary since the standard station separations then adopted ensured that these limits would be observed.

FIGURE 2 (a)

Relationship of a Desired Signal to an Undesired Signal

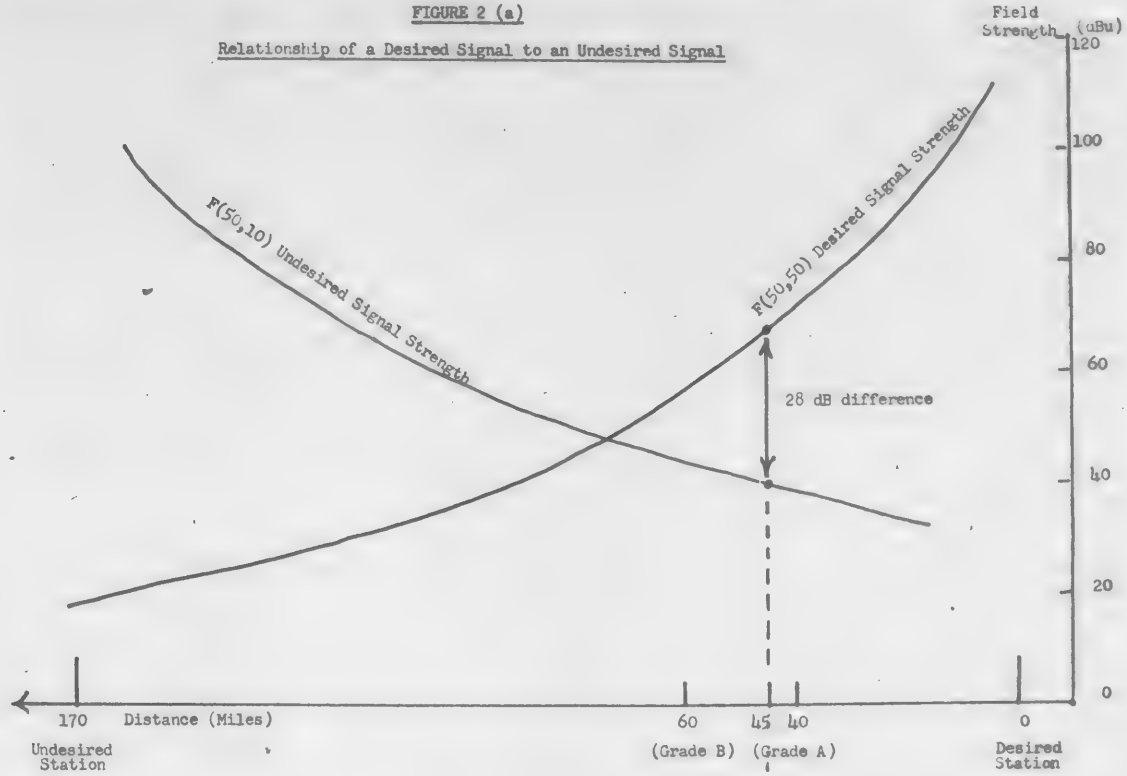
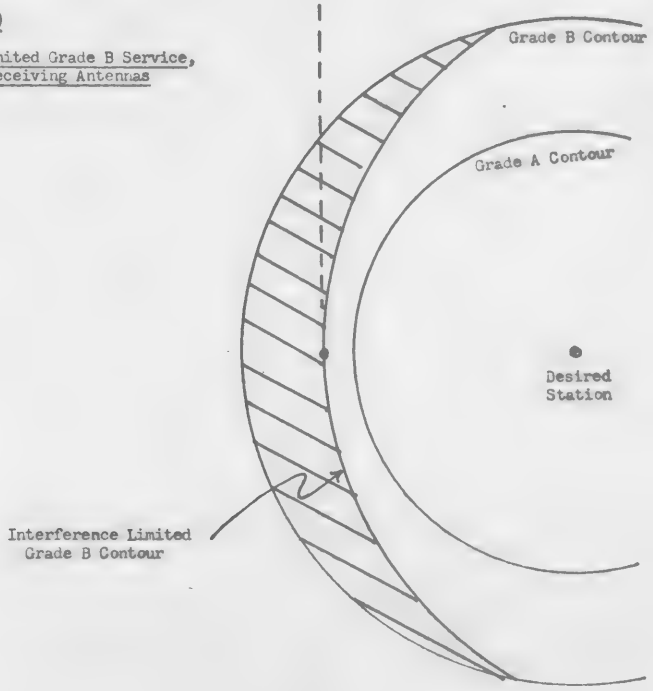


FIGURE 2 (b)

A Plan View of Interference Limited Grade B Service, Assuming Non-directional Receiving Antennas



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In examining this diagram it is worth keeping in mind a statement made in paragraph 94 of the *Sixth Report and Order:*

"It is recognized that there exist no sharp line of demarcation between service and interference but that the service available may be more satisfactory or less satisfactory in varying degrees.

The joining of all points at which the D/U ration is 28 dB results in a new contour which we may call an "interference-limited" contour. The example given assumes that the receiving antenna is non-directional, that is, that it receives the undesired signal equally as well as the desired signal. We will return to this assumption in paragraph 106, *infra.*

Equivalent Protection

97. When a station is placed at less than the standard distance from a co- or adjacent-channel station, its radiated power can be reduced until its (undesired) signal strength at the interference limited contour of the station to which it is short spaced is no higher than the strength of a signal from a full power station at the standard distance. If this adjustment in the short spaced station's radiated power is made, the other station receives *protection* from the interfering signal that is *equivalent* to that provided by the minimum separation distances adopted by the Commission when the Table was set up. We now propose to adopt this "equivalent protection" standard as the standard for determining where future VHF television allotments can be made. Allotments for new VHF stations would be added to the Table in conformity with the rule changes we proposed today if they provide "equivalent protection" to existing VHF stations. "Equivalent protection is achieved as follows:

by limiting the radiation of the new station so as to cause no more interference than would result between cochannel stations operating at standard minimum spacings with maximum height and power. The technical definition is that amount of suppression sufficient to maintain a 28 dB ratio between the estimated F(50,50) signal strength value of the desired signal and the estimated F(50,10) signal strength value of the undersired signal (45 dB in the case of nonoffset, nonsynchronous cochannel operation), at the same distance from the existing station as would occur if the stations were operating with the maximum permissible facilities at standard minimum separations. In other words, a drop-in could present no more interference than would a new station with full facilities and no short-spacing. Equivalent protection to adjacent channels is achieved following the same procedure to maintain a 0 dB ratio between the estimated F(50,50) signal strength value of the desired signal and the estimated F(50,50) signal strength value of the undesired signal.[89]

The application of this principle is shown in figure 3. The power of the short-spaced station has been reduced so that it maintains the 28 dB difference at the point established by the full power station at standard spacing.

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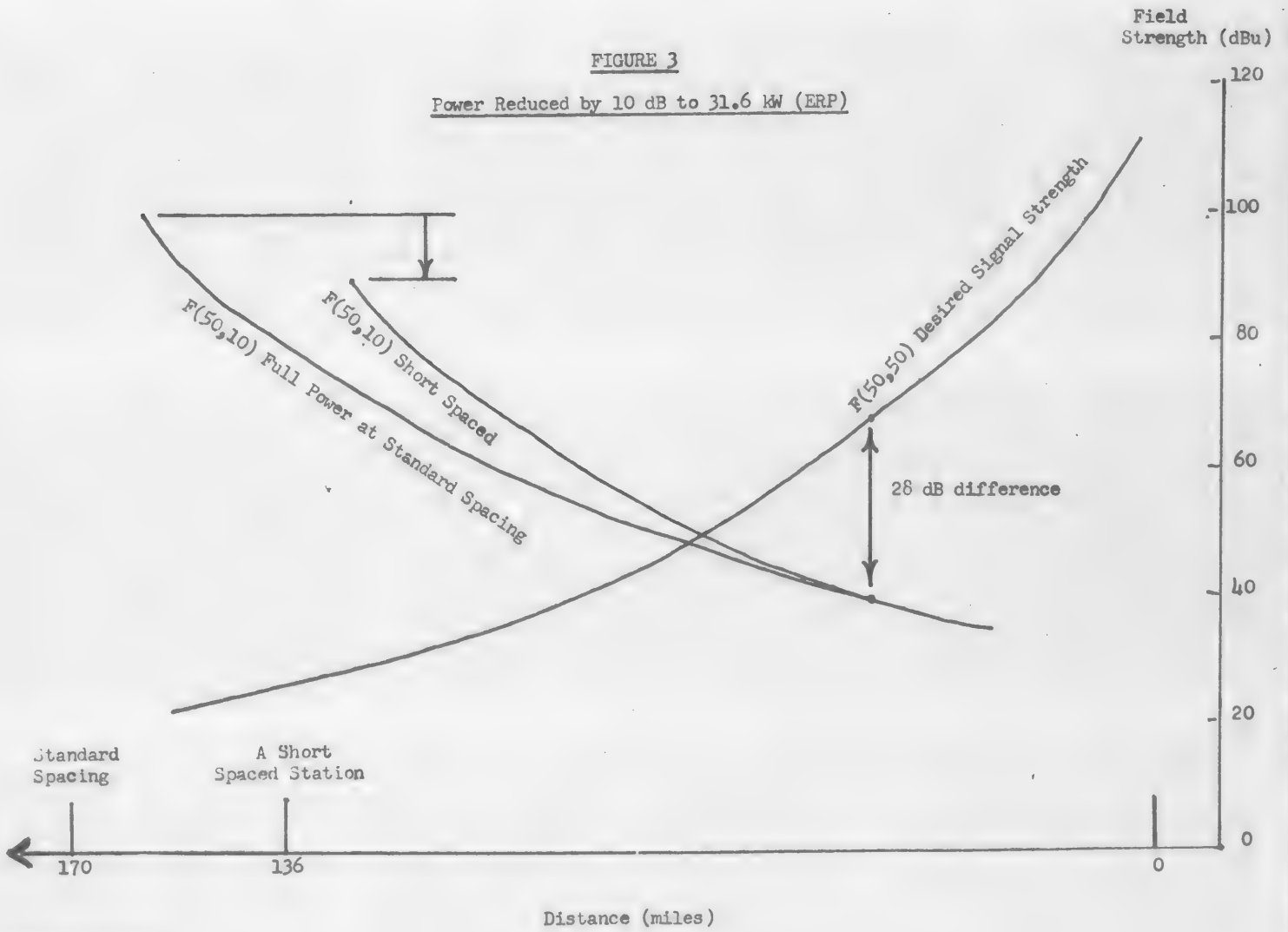
[89] *Memorandum Opinion and Order and Notice of Proposed Rule Making* in Docket No. 20418, 63 F.C.C. 2d 840 at paragraph 41 (1997). Note that this definition assumes the protected station is operating at full power and maximum antenna height. Thus, if the existing station to which a Limited Facility Station (LFS) is short spaced is not at full facilities it can later increase its facilities without any adjustment by the LFS.

FIGURE 3

Power Reduced by 10 dB to 31.6 kW (ERP)



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98. Implementation of the "equivalent protection" standard assumes a departure from existing practices in the allotment process. First, we propose to amend our Rules to reflect this reduced spacing criterion. Petitions for the addition of new allotments meeting the equivalent protection criterion would be explicitly provided for in our Rules. Such petitions would be treated as routine, in the same manner as petitions for new allotments that meet the standard mileage separation criterion.[90] Second, because of the flexibility of this approach, we think the vast majority of proposals for new VHF allotments could be accommodated within the proposed rules. While we would continue to entertain petitions for waiver of this part of our rules, we would expect petitioners for new allotments to expend their first effort to adapt their proposals to the constraints of the equivalent protection criterion. Thus, future waiver applicants would face the initial burden of demonstrating that they tried, but were unable, to comply with this fundamental technical requirement. They then would be subject to the customarily high burden required under the waiver standard.[91] Third, requests for new allotments that meet this equivalent protection criterion would no longer be characterized as "drop-ins." Once approved, these new allotments would then be available to license applicants as is now the case with additions to the Table. Allotments for stations that are not authorized to operate at maximum permissible transmitter power or that are required to directionalize their antenna pattern in order to comply with the Rules would be designated as Limited Facility Stations (hereinafter "LFS") and identified with an "L" in the Table of Television Channel Allotments.[92] Applicants for such stations would have a limitation, as part of their license, that requires them to operate with lower than the maximum radiated power otherwise permitted by the Rules in some direction or directions.[93]

99. In all other respects, an LFS will have status equal to that of full power stations. Thus, following Commission approval of an LFS allotment, subsequent applicants for new allotments would have to provide an existing LFS the same equivalent protection provided to a full power/full spaced station. Similarly, one a new LFS is added to the Table, its status as a full-fledged VHF allotment would imply protection of its signal from changes in the antenna location of existing stations in its vicinity. Licensees of existing stations proposing antenna moves that would have an adverse effect on the LFS's coverage would have their licenses conditioned to require that they provide protection to the LFS.[94]

100. As proposed, future additions to the Table need no longer be accompanied by engineering studies counting theoretical service gains and losses (i.e., the number of added households reached or formerly reached but now believed unreachable due to interference) within and outside of variously defined service areas according to variously defined assumptions. The four waiver requests granted by the Commission in Docket No. 20418 illustrate the difficulties associated with that type of analysis.[95] In granting future new VHF allotment proposals we intend to rely, instead, on a general assumption that, where equivalent protection is provided to existing stations, the public interest will generally benefit from the addition of a new station.[96] Thus, future requests for new VHF television allotments will be evaluated strictly in terms of technical compliance with our Rules and will no longer initially involve the calculation of hypothetical gained and lost service areas. If an interested party does choose to raise the issue of lost service during allotment proceeding, he will bear a heavy burden to demonstrate that the public interest will not be served by the gains in additional service.

Directionalization of transmitter antenna.

101. In the *Notice of Proposed Rule Making* in Docket No. 20418,[97] we raised the possibility of allowing the use of directional transmitter antennas with suppression ratios equal to or greater than that currently provided for in the Rules, thus enhancing the ability of an LFS to provide equivalent protection.[98] The new Table of Television Channel Allotments we now propose is intended to be as flexible as is technically possible, and yet still provide interference levels no greater than the level chosen as "acceptable" in the *Sixth Report & Order.* One means of insuring this flexibility is to allow petitioners proposing additions to the Table to make use of the best available transmitter antenna technology. To this end, we are proposing a new Rule § 73.685(e), that will allow routine approval of proposals for signal suppressions of up to 15 dB in any direction, compared to the signal strength in the maximum direction of radiation. In addition, we will entertain waiver petitions providing for signal suppressions of up to 25 dB, on a case-by-case basis, if the petitioner demonstrates that there will be no reflected signals of unacceptable level into the null.[99]

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[90] When a petition is filed with the Commission requesting the addition of a new allotment in conformity with the standard spacing requirements a proponent of a mutually exclusive use of the channel must submit its proposal during the comment period of the rule making proceeding. If no opposing party comes forward, the allotment request is normally granted. If preclusion is raised, in comments, the Commission weighs the evidence before it and allots the channel where it provides the most needed service. This same procedure would apply to preclusion questions raised by LFS allotment petitions.

[91] Petitions for such waiver would face "a high hurdle even at the starting gate," *WAIT Radio v. F.C.C.*, 418 F. 2d 1153, 1157 (D.C. Cir. 1969).

[92] While we wish to maximize the flexibility provided by these new allotments, it is not our intention to change the underlying distribution of television service the Table ensures. Existing licensees will therefore continue to be required to conform to the rules now in effect. Requests for waivers of these rules will continue to be subjected to searching scrutiny for conformity with the precepts of the *Sixth Report and Order.*

[93] The designation will also indicate that they do not have to comply with the requirement for a "city grade" signal over their entire "principle community". *See* paragraph 125, *infra.*

[94] This procedure would result in the limitation on the future flexibility of the existing station's allotment, i.e., the station would no longer be able to move its antenna closer to the LFS allotment. Consequently, we are considering accepting applications for construction permits from existing stations affected by the addition of a LFS for some initial period before granting the LFS allotment request without this limitation being added to their license, e.g., for three months, or until the close of the comment period in the notice of proposed rule making proposing the allotment. *See also* paragraph 128 *infra.*

[95] See note 72, *supra. Report and Order* in Docket No. 20418, ———FR ——— (October ——, 1980).

[96] We also believe that, generally, the new service provided on an equivalent protection basis will be much greater than any service that is lost. The basis for our conclusion as to overall service loss is outlined below in our discussion of receiver antenna directivity, terrain shielding and other service area considerations, below at paragraphs 103 through 111. It is possible in rare situations involving atypical propagation and terrain situations, that this presumption will be incorrect. Accordingly, we will entertain comments to the notice of proposed rule making adding each of these new allotments addressing the issue of service gains and losses. The burden of proof in these instances, will be on those opposing the addition of the new allotment. *See* Section VI., paragraph 64, *supra.*

[97] *Notice of Proposed Rule Making* in Docket No. 20418, 63 F.C.C. 2d 840, at paragraph 61 (1977).

[98] The existing rule limits the ratio of maximum to minimum radiation in the horizontal plane to no more than 10 dB because it was feared that antenna radiation pattern would become unstable if more than 10 dB directivity was allowed. 47 CFR 73.685(e) (1978).

[99] We would expect such a petition to make a detailed engineering showing of two preconditions: First, that the immediate topography surrounding the (proposed) antenna site must be free of large buildings or large natural obstructions that might serve as reflectors into the antenna pattern nulls; and second, that the frequency of the transmitter is sufficiently stable to ensure the antenna acts as designed. Since we expect the majority of these new stations to be required to implement precise offset,

Footnotes continued on next page

102. In reaching the conclusion that a rule allowing up to 15 dB suppression should be proposed, we have considered the studies cited by Association of Maximum Service Telecasters (AMST) in opposition ot this idea. We conclude, however, that the technical basis for the existing limit (10 dB), though once valid, is now antiquated.[100] Twenty years have passed since the compilation of the data on which we based our earlier conclusion. In the interim, technology has advanced to the point where transmitters with frequency stability necessary to allow higher directivity are now routinely available on the equipment market. More importantly, experience with antennas in Canada and elsewhere has demonstrated that greater directivity, without unacceptable degradation of protection criteria, is achievable with today's antennas.[101] In light of this record, we think it is important that we amend our Rules to take advantage of this increased technical flexibility to intensify utilization of the valuable VHF television spectrum.

Receiver Antennas Front-to-Back Ratio

103. We are less satisfied with the amount of information in the record of Docket No. 20418 on the question of receiver antenna directivity. That record is devoid of quantitative data except for some limited observations by the Group for the Advancement of Television Service (GATS). Historically, the Commission has assumed the receiving antenna to be nondirectional. The *Sixth Report and Order* gave three major reasons for this assumption:

(1) Directivity is needed as a safety factor to permit adjustment of the antenna to minimize multipath distortion and local oscillator radiation;

(2) Not taking into account the directivity of the receiver antenna allows use of the antenna in a compromise orientation for the reception on the same antenna of several desired signals from stations located in different directions; and,

(3) Directivity should be used as a safety factor to permit adjustment of the antenna to minimize the effect of multiple source interference.

In other words, *Sixth Report and Order* treated the receiving antenna directivity as a safety factor that would tend to reduce the amount of interference resulting from two full facility stations operating at or near the minimum required distance separation. This safety factor was appropriate at the time because of uncertainty regarding how well the interference model reflected the real situation. Even if the model used in the *Sixth Report and Order* had been reasonably accurate, it was not clear at the time that the choice the Commission made regarding the amount of interference to be tolerated was the best compromise available. The Commission was comfortable with this uncertainty because when the safety factors (*e.g.* terrain shielding, directional receiver antenna, etc.) utilized in its allotment scheme were factored in, the safety factors would prevent extensive damage to the overall service. If actual experience turned out to be approximately that predicted by the curves there would be considerably less interference than the acceptable worst case projection.[102] Today, with twenty-five years of experience, we no longer face this same degree of uncertainty. It now appears clear that the present separation distances (or protection equivalent to that guaranteed by the standard separation distances) causes little unacceptable interference.[103]

104. We now know that high gain, directional receiving antennas[104] have been well used by viewers to overcome many situations involving potential interference and lack of service. Their use has made an important contribution to the quality and quantity of television reception in many, generally rural, areas. Their use has also reduced the actual loss of service in the predicted interference areas of stations meeting the minimum spacing requirements. In addition, since we propose to allow this spectrum to be more heavily used, this safety factor will take on even more importance in the future. Rather than automatically assuming the universal use of directional receiver antennas, we believe it is preferable to continue to use this technical tool in individual instances to overcome particular cases of interference.[105] Thus, we will continue to treat receiver antenna directivity as a safety factor rather than incorporating it into our equivalent protection criterion.

105. Even if we wished to incorporate some adjustment factor for high gain receiver antennas into our VHF television frequency allotment scheme, we do not a this time have available, in the record of Docket No. 20418 or elsewhere, the type and amount of data necessary to quantify this parameter with the necessary degree of accuracy. Furthermore, the test studies cited in footnote 104, *supra*, raise numerous problems with the incorporation of an assumed average receiving antenna front-to-back ratio[106] in our protection criteria. First, although all antennas exhibited some front-to-back ratio across the entire VHF–TV band, variations of more than 10 dB were observed in the performance of a single antenna on different channels. Second, the direction of the high and low gain areas are frequency dependent, thus an antenna oriented to maximize the

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Footnotes continued from last page
we do not expect this frequency stability requirement to be a significant additional cost in most instances.

[100] Filings in the record of Docket No. 20418 report operational VHF television transmitter antennas with signals suppressed below the maximum effective radiated power (ERP) by as much as 23 dB. In the absence of tall buildings or mountains situated so as to cause reflection of unacceptable levels of signal into the "null," we conclude that the use of these more directional antennas is possible provided each proposal is carefully reviewed to protect existing spectrum users.

[101] *See Memorandum, Opinion and Order* in Docket No. 20418, 63 F.C.C. 2d 840 (1977) at paragraph 61 and 62.

[102] *Sixth Report and Order*, 41 F.C.C. 148 at paragraph 109.

[103] During the first decade following the *Sixth Report and Order* the Commission licensed an average of 45 VHF stations per year; the second decade averaged 11 per year and the last eight years average 5 per year. As the available channels filled up, particularly in the Eastern and Western coastal corridors, numerous stations have been added at or close to the minimum mileage separation distances. At this point virtually every East Coast station has one or more channel stations at close to the minimum mileage separation distances from it and six stations have stations less than this minimum from them. (In these six instances the Commission utilized equivalent protection to "move-in" stations below the mileage standards.) We note that the addition of the last 25 stations to the already crowded Table of the six instances involving move-ins using equivalent protection did not result in a surge of interference (RFI) complaints by viewers of the existing stations. Since television viewers have historically been very quick to alert the Commission to instances of RFI, this silence strongly suggests that objectionable interference rarely results from the addition of a new television station at the minimum separation distances (or below these distances if equivalent protection is used.)

[104] *See e.g., NBS Report No. 6099*, Performance of VHF–TV Receiving Antenna *(May 26, 1960); NTIA Report 79–23*, Television Antenna System Components, *R. G. Fitzgerrell* et al. *(June 1979)*. Johnstown VHF Drop-In Study, *W. P. Huber, F.C.C., Pittsburgh Field Office (February 15, 1980)*; Report of the Television Allocation Study Group, *Table 3, at 138 (1957)*.

[105] This would include the availability of such highly directional receiver antennas to reduce the actual loss of service in predicted interference areas of stations meeting the equivalent protection requirement as well.

[106] We use "front-to-back ratio" to mean a measure of an antenna's ability to discriminate against signals striking it from the back. The front-to-back ratio compares the reception of signals hitting the front 180° of the antenna to the back 180°. This is contrasted with antenna "directivity" which is the ratio of the maximum radiation intensity of the antenna to the average radiation. A third term also used to describe an antenna's performance characteristics is "gain" by which we mean a ratio of the maximum radiation intensity of the antenna to the maximum radiation intensity from a reference antenna (usually a half wave dipole) with the same power input.

desired-to-undesired ratio of the signal received from one station may in fact be maladjusted for optimum rejection of an undesired signal at a different frequency. Lastly, it was determined that under actual field conditions the directional patterns of receiver antennas in use often varied greatly and generally were different than when measured on the antenna test range. Because of these problems, we will not assign a value to the receiving antenna directivity factor or grant waivers to our equivalent protection requirement based on attempts to show that directionalized antennas permit closer spacing of stations.[107] We aknowledge its availability as a tool that, in many cases, can be used to reduce or eliminate predicted interference, but we think this potential has already been adequately factored into our process for spacing television allotment.

106. Although we have not chosen to incorporate antenna directivity into our proposal of equivalent protection, its value as a safety factor should not be underrated. In the example given earlier we followed the longstanding practice of treating all receiving antennas as non-directional. This is highly artificial because, insofar as we are aware, *all* receiving antennas *are* directional to a greater or lesser extent. In fact studies show that, despite their variability, rooftop antennas of reasonable quality (generally, those selling for $35.00 and up) can usually achieve an 8 to 12 dB front-to-back ratio. In fact, not unduly expensive antennas are available that provide 20 dB front-to-back ratios. Choosing the least of these figures and drawing on the discussion beginning in paragraph 90, *supra,* we will provide one last diagram. The employment of precise carrier offset reduces the required D/U ratio to 24 dB. The use of a receiving antenna having a front-to-back ratio of 8 dB has the effect of reducing the D/U ratio still further to 16 dB. This produces a shift in the location of the interference-limited contour in a direction away from the existing stations, as shown in figures 4(a) and 4(b). The assumed station parameters are the same as those used in the preceding illustrations.

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[107] Naturally, a television household at the perimeter of a station's interference limited contour is more likely to employ an outdoor antenna having better characteristics than a household located inside, say, the Grade A contour. In addition, while it is more of a sociological than an engineering observation, the households most strongly desiring the station have resorted to self-help to improve their reception, so that theoretical losses of service must be offset by the probability that those most in need of service and most lacking in over-the-air alternatives long since have taken their own corrective action, where it was technically possible to do so. In short, we believe that it is a serious mistake to underestimate the determination and intelligence of TV watchers, particularly in isolated rural areas where the problems of poor reception and the strategies for overcoming it have been a familiar part of the landscape for many years.

FIGURE 4 (a)

Relationship of Desired to Undesired Signal

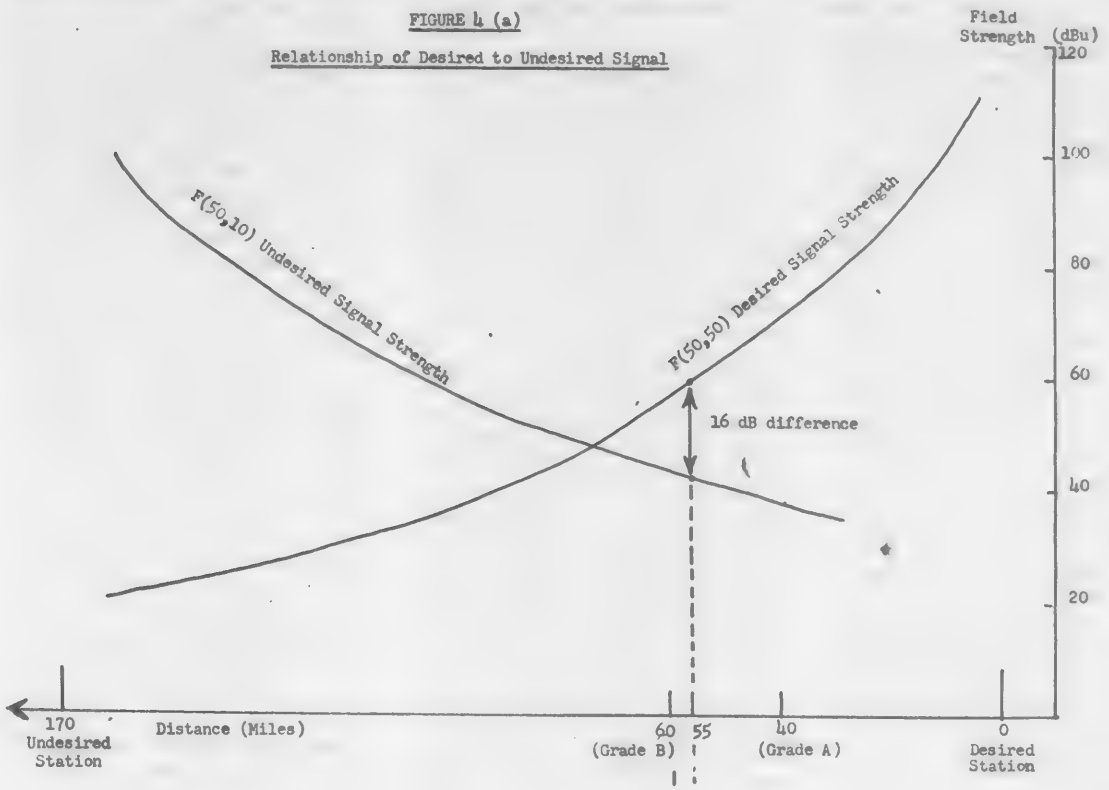
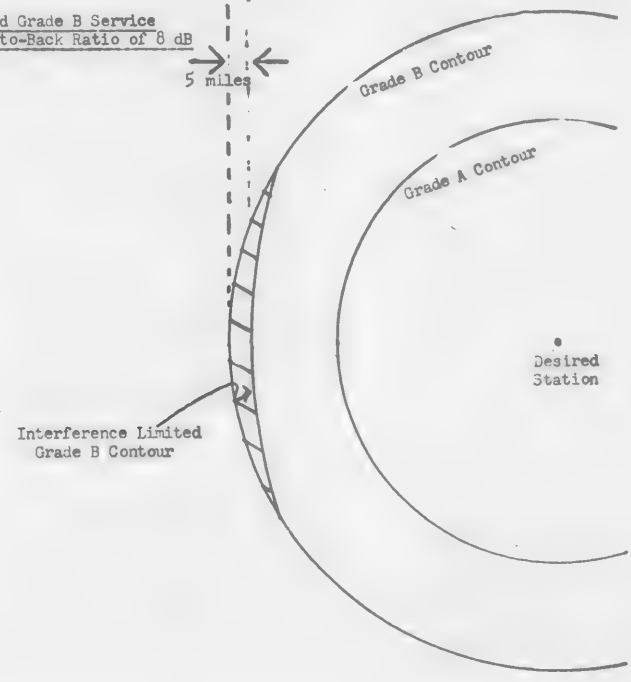


FIGURE 4 (b)

A Plan View of Interference Limited Grade B Service Assuming Precise Offset and a Front-to-Back Ratio of 8 dB



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107. Several observations concerning picture quality are in order at this point. The picture quality at the interference-limited contour received at the best 50% of the locations 90% of the time will be equivalent to or better than a TASO 3 (interference perceptible but not objectionable). At the noise-limited Grade B contour it will have decreased to approximately a TASO 4 (interference somewhat objectionable). Within the shaded area the quality of service will vary from TASO 3 near the interference limited contour to TASO 4 near the noise limited Grade B contour for the same 50% of the locations/90% of the time measurement. At worst the interference will have increased by a modest amount along the outer margin of a cresent measuring 5 to 6 miles thick. The same results could have been achieved without precise offset by using a receive antenna with a 12 dB front-to-back ratio. Continuing this line of reasoning, we note that the D/U ratio at the noise limited contour is 16 dB in the examples we have given. Any combination of precise carrier offset and antenna directivity adding up to 16 dB would shift the interference-limited contour to a position congruent with the noise-limited contour. In such a case there would be no predicted loss of service within the Grade B area.

108. During the pendancy of Docket No. 20418 the Commission's staff investigated the question of receiver antenna characteristics. As a result, several observations on typical home receiver antenna characteristics can be made. A survey of rooftop antennas in Grade B service areas was conducted. Though limited in scope, this survey indicated that the vast majority of homes employed rooftop antennas when cable TV was not present, and that the vast majority of these antennas had ten elements or more; these include log periodics which is a type of antenna that did not exist in 1952. The results of studies of antenna characteristics were then reviewed to quantify the front-to-back ratios of the types of antennas that are in actual use today. The reported studies indicated these types of antennas have an average front-to-back ratio, across the VHF band, of 11.5 dB. to 12 dB. Given the possibility that some viewers still employ older antenna types that have poor performance, and the possibility that multiple source or multipath interference might require intentional misalignment of an antenna, we selected a more conservative average antenna front-to-back ratio of 8dB for the purpose of estimating the actual amount of interference that would be caused by the proposed rule changes.

Effects of terrain

109. The state of the record in Docket No. 20418 on the question of terrain shielding of undesired (co-channel) signals is not sufficient to provide a basis for specific rules at this time. That rugged terrain can attenuate co-channel signals from a distant interfering source is beyond dispute. Similarly, rugged terrain can significantly attenuate the size of a station's Grade B service area, decreasing the service area to which interference actually would be caused. The unresolved problem is how to quantify the terrain shielding phenomenon in the form of a terrain correction factor that could be incorporated in the FCC propagation curves in order to predict the reduced signal levels with the desired degree of confidence. Studies of automated terrain correction computer programs were included in the record of the proceeding, but these models are still developmental and need further field measurement.[108] Actual signal levels were measured in the field environment in support of particular new allotment proposals, but these submissions cannot be relied on because the measurement procedures specified in the Rules (or an equivalent alternative) were not used and supporting test condition documentation was missing.[109]

110. A terrain correction factor was developed and incorporated into the FCC Rules in 1975, but reliance on this factor was suspended later that year when it became apparent that there were too many unusual situations where the procedure produced illogical results.[110] A similar situation of uncertainty and lack of field verification exists relative to the automated terrain correction factors submitted for consideration in Docket No. 20418.[111] No attempt was made to verify the computed results of the various test cases and, in some instances, computed results differed so greatly from the results of selected hand calculated results (which allow rational selection of what type of correction factors to apply, but are too cumbersome to utilize on a general basis) that errors obviously exist in the automatically processed results.

111. We recognize that in highly unusual circumstances, neither the proposal contained herein nor any other general method will provide satisfactory estimates of coverage and interference. Anomalies caused by extreme variations in topography will be treated on a case-by-case basis. Although terrain considerations will continue to be examined on a case-by-case basis, we do not expect to grant waivers to the equivalent protection standard proposed today on the basis of alleged terrain shielding effects. We prefer, instead, to continue our investigation of this area. When we have developed an adequate record on this question. we will propose a further amendment to the Rules to correct our propagation curves accordingly. Prior to that time, the added attenuation to distant interfering signals provided by terrain shielding will continue to be a safety factor that, in some instances, will result in less interference than is assumed by our Rules. We will also, of course, consider any additional data on this question submitted in response to this *Notice.*

Changes in Carrier Offset

112. Under the system for future additions to the Table of Television Channel Allotments we are proposing today, new stations are required to provide equivalent protection to existing co-channel stations. We are defining this protection using a desired-to-undesired signal ratio of 28 dB at the protected station's interference limited contour, assuming the added and existing stations are offset.[112] Adding new stations to the VHF television service will frequently require existing stations to change their offset designation. As more stations are added, the number of existing stations thus affected may increase. When proposing how to allocate this added expense (and the added expense of precise offset discussed below in paragraph 47), one of the Commission's most important concerns is to do so in a manner that encourages the use of these spectrum saving techniques and also equitably distributes the expense of utilizing the available radio spectrum more extensively.

113. The burden of the equipment cost to existing VHF television licensees necessitated by the addition of a new station to the existing VHF service can be shared in several ways. At one

[108] *See e.g., Techniques for the Evaluation of Proposed VHF TV Drop-Ins,* G.A. Hufford, OT Report 77–112 (July 1977).

[109] *See, e.g.,* Engineering Exhibit attached to petition for rule making (RM–2727) filed July 9, 1976 by the Group for the Advancement of Television Service.

[110] *Report and Order* in Docket Nos. 16004 and 18052, 53 F.C.C. 2d 855 *but see,* 56 F.C.C. 2d 749, 750 (1975).

[111] *Notice of Proposed Rule Making,* 63 F.C.C. 2d 840, at para. 66 (1977).

[112] When offsetting is not possible and synchronous carrier frequency control is not utilized, a 45 dB protection ration must be observed. *See* paragraph 94, *supra.*

extreme, the proposed new station can bear the entire burden of any changes necessary to accommodate its presence. At the other extreme, each licensee affected by a new station can bear its own additional costs. Or, as an intermediate approach, a cost sharing scheme could be negotiated between the stations. Requiring that the new licensee bear the cost of every stations' modifications will create an additional financial barrier to the introduction of new stations. In certain instances this barrier may foreclose the creation of a new broadcast outlet that would otherwise provide additional service to the public. Furthermore, it might be inequitable to require the new station applicant, merely because it appears on the scene later in time, to bear the entire cost of imposing on other licensees spectrum efficiency measures that have a general public interest benefit.[113]

114. As the spectrum became more crowded, the Commission has decreased channel bandwidths,[114] required the addition of polarization diversity,[115] increased the channel loading and in other ways intensified the utilization of the available spectrum in order to accommodate the growth of demand for the spectrum resource.[116] In these situations, it has been our general policy to require each user to bear the cost of upgrading its own equipment to the new, more spectrum efficient standard.[117] This approach was adopted because radio spectrum is a public resource in which no user gains a vested right. Every time the Commission has found it in the public interest to mandate more efficient equipment, we have decided that each user had to share the burden of the additional equipment cost, as part of its right to continued use of the spectrum. Under this approach each station would bear the cost of modifying its own equipment in order to accommodate additional spectrum users.

115. The manner in which the Commission now allocates the cost of adding new television channels to the Table is contrary to the approach followed elsewhere when we have implemented spectrum conservation measures. The eventual permittee for a new television allotment bears the cost of offset changes of existing licensees necessary to accommodate the proposed new station. Although this procedure does not involve a sharing of the burden, it is not totally one-sided. The tradeoff is that the existing station consents to an immediate modification of its license to implement the needed offset adjustment, rather than waiting until the end of its three year license term or insisting upon a hearing. This benefits the new station and the public by allowing an earlier operational date.[118]

116. Continuation of this procedure may not be required in the future, if, in the context of this rule making, we determine that this type of shifting of costs is not in the public interest. The record on the desirability of maintaining or abandoning this practice is not sufficiently complete to warrant Commission action on the matter at this time. Accordingly, we will leave this question open for further comment. When the rules proposed today are considered for adoption by the Commission we will also define our policy, if indeed any is needed, on future conduct as to the allocation of costs in these circumstances. At this point, we believe the approach most consistent with the Commission's practices generally and most approach most consistent with the Commission's practices generally and most desirable from a public interest viewpoint would be to require each licensee to bear the cost of equipment modifications necessary for its continued use of the spectrum.

Use of Precise Offset

117. We also are considering the possibility of requiring the use of precise offset,[119] to provide further improvements in picture quality beyond that provided by our equivalent protection criteria.[120] This raises a corollary issue of how to allocate the costs of precise offset if its use were required. At the outset, we can state unequivocally that the use of precise offset is desirable and we wish to encourage its use. The use of precise offset has been demonstrated to improve the quality of reception of a desired signal in the presence of an undesired co-channel station by the equivalent of four to six dB.[121] As the VHF television spectrum becomes more valuable, reflecting both increasing demand for existing services and the increasing number of potentially beneficial uses of the spectrum, it becomes increasingly important that spectrum be used as intensively and efficiently as possible. Once a particular licensee receives limited rights to a portion of the spectrum, there is little or no incentive to be concerned about interference to other spectrum users (*e.g.*, to invest additional resources to replace current equipment with newer, more spectrum efficient equipment). In fact, to the extent that adjacent or co-channel spectrum users represent potential competitors, interference to them may benefit the licensee.

118. A major reason why the individual licensee does not have the incentive to make such investments is that it does not pay for the spectrum it uses. This has two effects: (1) If a licensee has unlimited free use of the spectrum protected by minimum separation requirements there is very little incentive to improve equipment to permit more intensive use of the spectrum; and, (2) because the licensee has a guaranteed market share arising from monopoly control over a particular portion of the spectrum resource, there is no motivation to negotiate with prospective competitors to reach an agreement by which new entry into its market can take place. Thus, in the absence of a spectrum fee it may be more in the public interest to require that resources be expended on equipment that permits more efficient use of the spectrum than and prospective new LFS operators. Since the technology for precise offset now appears to be available at a modest cost compared to the total investment in a VHF television station, the approach we shall propose will be one designed to foster its use in as many circumstances as possible.

119. We propose to use precise offset as an interference reducing tool that either new or existing licensees can use to capture (or recapture) service areas not guaranteed them by our equivalent

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[113] When precise offset is utilized both stations enjoy an enlargement of their coverage areas.

[114] Channel-Splitting in the Maritime Band, 156–162 MHz. 13 F.C.C. 2d 874 (1968); Frequency Allocations 450–470–MHz. Band, 11 F.C.C. 2d 648 (1968); Frequency Allocations 450–470–MHz. Band, 10 F.C.C. 2d 885 (1967); channel Splitting 450–470–MHz. Band, 8 R.R. 2d 1629 (1966); *Report and Order* in Docket No. 18263, 19 R.R. 1663, 1670 (1970). *Cf.* Report of the Advisory Committee on Land Mobile Radio Service, Vol 1 at 45 (1967).

[115] *See e.g., Notice of Proposed Rule Making* in Docket No. 21505, F.C.C. 79–310, 44 FR 32420 (June 6, 1979), 45 R.R. 2d 1203 (1979).

[116] *See e.g., Further Notice of Proposed Rule Making* in Docket No. 13847, 10 F.C.C. 2d 885, 896, paragraph 36 and 37 (1967).

[117] The Commission has also implemented antenna performance standards in the Common Carrier Point-to-Point Microwave and Private Operational Fixed Microwave Service, in each case requiring each spectrum user to bear their own costs. 47 CFR 94.75(b), note 1.

[118] *See e.g., Booneville, Mississippi*, 40 F.C.C. 2d 629, 634 (1973).

[119] Precise Offset is accomplished by offsetting a station's carrier frequency 10,010 Hertz and keeping it within about 2.5 Hertz of that frequency. To accomplish this, the station must be equipped with special equipment that currently costs approximately $10,000, but which should cost somewhat less in the future as the demand for this type of equipment grows. *See* paragraphs, 120–121 *infra.*

[120] *See* paragrph 106 *supra.*

[121] *See, Notice of Proposed Rule Making* in Docket No. 20418, 63 F.C.C. 2d 840 at paragraph 59 (1977).

protection criterion. The 28 dB equivalent protection standard we propose to adopt as the cornerstone measurement of a station's protected service area limits objectionable interference to an area close to a station's noise limited Grade A contour (as defined in § 73.683 of the Rules). If a new station begins operating at the allowed minimum distance from an established station, there may be viewers in the established station's audience within the region between the noise limited A and B contours who will no longer be able to receive an acceptable picture from the established station. In addition, a very small portion of the predicted Grade A service area will be degraded to slightly less than Grade A service quality (but still better than Grade B). We have concluded, based upon the record in Docket No. 20418, that, because of terrain shielding in some cases, the ability to orient highly directional receiver antennas in others and the availability of substitute sources for the "lost" signal (e.g., cable systems), many of these potentially "lost" viewers will not be lost or can be recovered. We propose to reserve the use of precise offset as an additional safety factor to be used at the election of the affected stations.

120. Specifically, we propose to allow either of two stations so spaced that it receives interference within its noise limited Grade B contour (i.e., a D/U ratio of less than 28 dB at the noise limited Grade B contour) to elect to use precise offset to regain some of the potential service area lost to this mutual interference. If one station requests the use of precise offset, both stations will be required to use precise offset. Consistent with our general policy of distributing the cost of spectrum saving technologies among all users of the spectrum, we propose to require each station to bear the cost of its own equipment modification. This cost distribution is equitable, we believe, because both stations will enjoy larger interference-free Grade B service area as a result of the introduction of precise offset operation.

121. Since a station required to go to precise frequency offset operation by one co-channel station will face no additional cost if it requests that other co-channel stations interfering with its signal also be required to go to precise offset, we expect the majority of stations in the more spectrally crowded areas of the country to convert to precise offset over a period of time as a result of this chain of requests spreading. The introduction of this new equipment, with costs borne by all spectrum users, is appropriate for efficient utilization of the highly-valued spectrum in these high demand areas and the resultant more intensive use of the spectrum is clearly in the public interest.

IX. Additional Policy Considerations

122. The cumulative result of the technical and policy changes we propose above is a new orientation toward the expected service area of both existing and new VHF television stations. The existing Table of Television Channel Allotments is virtually saturated in medium and large markets. The objectives of the VHF television allotment scheme implemented by the *Sixth Report and Order* [122] have been substantially achieved. The only additional service that can arise from this spectrum must come from its more efficient utilization. A significant amount of VHF television spectrum remains vacant, though primarily it falls outside the Table, and largely outside the major markets. In the absence of demand for television services we might not be concerned about this unused spectrum capacity. But, in light of the continued strong demand for more television programming, both in terms of quantity and diversity offered, it cannot be in the public interest to allow this spectrum to remain fallow.

123. To achieve this greater efficiency, we propose to introduce a flexible allotment scheme that permits the tailoring of each station's effective radiated power (ERP) to use up to the full remaining capacity of these under-utilized spectrum areas, stopping short of causing more interference than was initially found acceptable under the *Sixth Report and Order*. The existing grid of VHF television allotments, and the fixed UHF television allotment scheme, will remain in place to guarantee basic television service to the vast majority (over 96%) of the population. Superimposed on this fundamental system,[123] we envision a patchwork of new limited VHF television allotments dictated in size not by a desire to provide broad universal coverage to large areas of the country, but rather defined by the existence of sufficient demand for television service to support a station. Of course the parameters of these new stations will be constrained by the limited amount of spectrum still available.

124. Since these new stations must fit into and protect an irregular distribution of existing stations, each will be unique to the particular underserved market it seeks to serve. Therefore, certain rules and practices used by the Commission to evaluate the desirability of creating new allotments or granting new license assignments, based on general criteria that were relevant to the 1950's, are no longer desirable. *See* Section VI, *supra*. The type of analysis used to consider and reject VHF drop-ins in the past is of questionable validity not only in terms of spectrum efficiency but also because it proceeds from the improbable assumption that the Commission, rather than the prospective broadcaster, has the most knowledge about the demand for additional service and the other criteria that determine how this remaining spectrum capacity might best be used. Thus, the justification for a proposed new allotment will not depend on how many people it can potentially serve, but rather on how many people will actually be interested in the service. The prospective broadcaster will define the desired service, limited only by the requirement that existing stations be protected from unacceptable interference, i.e., by providing equivalent protection, and by preclusion. *See* Section VI, *supra*. Since starting up a television station requires a large capital investment, we think it is unlikely that proposals for allotments serving minimal service areas will become a real source of spectrum waste.[124] Furthermore, the economic dynamics of television service creates a strong natural incentive for the businessman to try to serve as large an audience as possible.[125]

125. Consistent with this deemphasis of an idealized service area as a measure of a new station's desirability, we propose to no longer consider the

[122] Adoption of the Table was predicated on three primary considerations: (1) Efficient use of the spectrum allocated to television; (2) a truly universal nationwide television service and, (3) preventing procedural delay in the granting of licenses. *Sixth Report and Order*, 41 F.C.C. at 152 (1952).

[123] Which serves, among other purposes, the statutory goal of guaranteeing a fair and equitable distribution of this radio service to all citizens. 47 U.S.C. 307(b) (1962).

[124] Assuming a straight line depreciation over 15 years, it is estimated that the annual cost associated with a transmitter and antenna, including its electrical needs is $55,360 and $82,350.00 respectively for 100 KW (low VHF) and 316 KW (high VHF). These figures are exclusive of the cost of personal, building and plant, especially studio equipment. *Staff Report on: Comparability for UHF Television*, Table 5–1 at 76 (September 1979). The low power television service, adopted by the Commission in a rulemaking on September 9, 1980, provides a less expensive option for achieving this objective. *See* NPRM in Docket No. 78–253, 45 FR 69178 (October 17, 1980).

[125] For example, of the 583 commercial VHF television stations licensed in the 48 contiguous states, 531 have facilities that result in a predicted noise limited Grade B contour within 20 miles of the maximum possible Grade B contour (i.e., 60 miles of a possible 80 mile radius, or 45 of a possible 65 mile radius.)

"city grade service" or coverage of the complete "principal community" as a criterion when evaluating proposals for new VHF television allotments.[126] We expect the petitioner to seek an allotment that would serve as much of a potentially available audience as is technically feasible and will continue to award merit on this basis in rule making proceedings involving a selection between different cities. Outside of such situations, no consideration would be given to whether the service area of future LFS allotments are designed to comprise a complete city or urban area, or whether the complete "principal community" receives a "city grade signal." We propose this change for two reasons: (1) The areas of unmet demand may not conform exactly to city boundaries; and, (2) many potential LFS allotments (where spectrum is currently going unused) may not conform exactly to city boundaries. In neither of these situations should potential new service be denied because of geographical or historical accident.

126. It is our intention, for the present, to continue to require applicants for new channel allotments and LFS licensees to ascertain the programming needs of the "community" they serve.[127] Consistent with the flexibility with which LFS licensees can define their proposed service area, however, we propose to allow LFS licensees to define any "community" as their "principal community" for the purpose of Section 73.685(a) of the Rules. We also propose to allow LFS licensees to specify "communities" that are subdivisions of cities, towns, villages, or other political delineations, as well as contiguous combinations of such areas as their "principal community" for the purpose of ascertainment.[128]

127. Consistent with our more flexible interpretation of "community," we also invite comment on how the comparative licensing policy for LFS facilities could be modified to give comparative weight to applications proposing to serve "communities" defined other than geographically, e.g., for ethnic, racial, or cultural groups.

Notice to Existing Licensees.

128. When a request is filed with the Commission for the creation of a new VHF television allotment under the rules proposed today, existing licenses within a 200 mile radius may be affected. Stations to which the proposed station is short spaced must be provided equivalent protection or they will experience unacceptable interference. Furthermore, stations in the same or overlapping markets will experience increases competition. In addition, there may be other factors that warrant providing notice of any new allotment to these existing stations and to other parties.[129] Consequently, we will continue our practice of placing petitions for rule making to amend the Table on 30 days public notice prior to disposition of the request. In addition, to ensure direct notice to those licensees who may be required to provide protection to the LFS signal, we propose that the petitioner be required personally to serve notice to all co- and adjacent channel stations to which it has less than standard spacing.[130]

Impact on Vacant Allotments.

129. A small number of unused VHF television allotments still exist in smaller cities. Because an application for a new allotment creates the immediate prospect for a new television service while the vacant allotment holds only the promise of a new service that might someday go into service, we believe it is inappropriate to restrict the service area of proposed LFS allotments to protect allotments presently in the Table.[131] Thus, the rules we are proposing do not require equivalent protection of vacant allotments. Once a licensee has been granted for an LFS allotment, a subsequent proposal for use of any vacant allotment at less than the standard spacing from the LFS will have to provide equivalent protection to that LFS. The equitable issues in the distribution of frequencies can be addressed by all interested parties in the course of rule making to amend the Table of Television Channel Allotments, whenever an LFS allotment would have a preclusionary effect upon the use of a pre-existing allotment that lies vacant and unapplied for.

130. If an application to activate a vacant allotment at less than standard spacing from a proposed LFS is filed before the Commission grants the new allotment, we propose to consider the license application without regard for the short spacing to the LFS, and the LFS application will be required to modify its proposal to reflect the added full facility station. In order to eliminate the possibility that applications for vacant channels will be filed in these circumstances simply to delay the introduction of an LFS or to preserve the unrestricted status of a vacant allotment for some projected future demand, license applications filed under these circumstances will be rigorously scrutinized for any indication that they are motivated by a desire to delay the introduction of an LFS. Furthermore, we plan to adopt a policy of refusing to grant requests for extensions of construction permits ("C.P.'s") granted under these circumstances. If the proposed unrestricted facilities do not begin operation on schedule, extensions of C.P.'s of such stations will be granted only if they propose to provide equivalent protection to the LFS petitioners and licensees.[132]

131. We believe that applicants who are proposing to fill an immediate demand for service should be preferred over allotments that have been available for almost 30 years and yet remain vacant. Adherence to this new policy will result in the reallotment of

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[126] *See* 47 CFR 73.685; *WSTE–TV, Inc. v. F.C.C.*, 41 R.R. 2d 1117 (1977), 33 F.C.C. 2d 435,451 (Rev. Bd. 1972); *Shenandoah Valley Broadcasting, Inc.*, 5 R.R. 2d 552 (1965); *Central Coast Television*, 2 F.C.C. 2d 306 (1966), 14 R.R. 2d 575 (Rev. Bd. 1968); *Cf. Riverside Amusement Park Co., Inc.* 69 F.C.C. 2d 1040 (1978).

[127] Section 73.685(a) of the rules requires each license to cover its "principal community" with a "city grade signal". This same principal community is the licensee's area of primary responsibility for ascertainment purpose. *See Ascertainment of Community Problems by Broadcast Applicants (Primer)*, paragraph 10, 38 FR 4093 (March 3, 1971).

[128] Accordingly, LFS licensees would not be bound by the earlier definitions of principal community in 73.685(a) of our Rules and cases such as *Capitol Broadcasting Co.* 5 R.R. 2d 231 (1965); *KSD/KSD–TV, Inc.* 38 R.R. 2d 1208, 1211, paragraph 11 (1976); *North American Communications Corp.*, 44 R.R. 2d 1635, 1643, paragraph 11 (1976); *North American Communications Corp.*, 44 R.R. 2d. 1208, 1211, paragraph 7 (1978). Cf. *Notice of Inquiry and Proposal Rule Making* in BC Docket No. 80–130, 45 FR 26390 at paragraph 15 (March 18, 1980).

[129] For example, existing stations may wish to relocate their transmitter antenna facilities prior to Commission approval of a nearby LFS allotment in order to avoid the requirement that they provide equivalent protection to the LFS. *See* paragraph *30, supra.*

[130] *See paragraph 99, supra*, specifying the circumstances under which we propose to require existing stations to provide protection to LFS allotments. Existing stations will have the period between, for example, the date an application for a new VHF allotment is put on public notice and the close of the comment period in the rule making proceedings proposing the new allotment in which to request changes in their facilities without being required to protect the proposed new allotment. Extensions of time on construction permits (C.P.'s) granted to existing stations under these circumstances will not be extended so that C.P.'s are not used as a means of preventing or delaying the introduction of a new allotment into an area.

[131] Because they are located primarily in small cities more than the minimum mileage separation distances from the top 100 markets, only two of the existing vacant educational allotments are close enough to a top 100 market to be significantly affected by the addition of an LFS allotment. We, therefore, do not propose special rules regarding the protection of vacant educational channels.

[132] Since our proposed new policy of not granting C.P. extensions under these circumstances could have harsh repercussions in certain circumstances, applicants for new or changed facilities at less than standard spacing from a proposed LFS should be careful to ensure that construction is completed within the 18-month period provided for by § 1.598(a) of the rules.

spectrum from the potential Grade B contour of the vacant standard spaced station to the actual Grade B contour of a soon to operate LFS station.

132. We conclude that this reallotment is desirable for several reasons. First, and foremost, this shifting of spectrum capacity will meet existing demand for new service. Thus limited spectrum will be realloted to areas where there is immediate demand for its use. Second, although there may be some shifting of maximum potential service area from the vacant allotment to the LFS allotment, we consider the potential service area thus shifted to be relatively unimportant. The radius of the interference limited Grade A contour of a typical VHF station is roughly 30 miles. Even with some restrictions imposed on it, the Grade A contour of a normally equipped station outside the largest cities (none of which have vacant television allotments) is many times larger than any city or metropolitan area to which it would be licensed. Thus there is little likelihood that the loss of even a substantial percentage of its potential Grade B service area will seriously affect a vacant allotment's ability to serve its designated city or seriously decrease its potential audience.

133. Third, the Low Power Television service we proposed in our *Notice of Proposed Rule Making* in BC Docket No. *78–253* adopted on September 9, 1980,[133] presents a much nore cost effective,[134] spectrally efficient,[135] substitute to the use of full power station allotments to provide service to a medium or small urban area. Given these considerations, we think it is in the public interest to make this spectrum available to those wishing to provide new service now.

Impact on Translators and Low Power Stations

134. Some of the proposed additions to the Table of Television Channel Allotments likely to be received as a result of the proposed rule changes will be for the use of frequencies currently utilized by television translators under Part 74, Subpart G, of our Rules. In addition, in a separate, recently instituted proceeding, we propose to create a new "Low Power Television Service" that may add hundreds of additional secondary [136] spectrum users to the VHF television bands. As television spectrum utilization outside the major urban centers intensifies (partially as a result of the various rule changes we propose today), situations will arise where existing translators and low power television will be forced to change frequencies by recrystalizing or, less frequently, by buying new UHF equipment because of the addition of an LFS close to their service area. In paragraph 206 of the *Notice of Proposed Rule Making* in Docket No. 20418, it suggested that the cost associated with this type of frequency shift of the translator (and, in the future, Low Power Television Stations) might be borne by the VHF Drop-in applicants.[137] After careful consideration of the equities involved, we conclude that it may not be in the public interest to burden potential applicants for full service VHF television stations with the cost of accommodating secondary spectrum users. Secondary spectrum usage is a license status accepted by this type of licensee with full knowledge that its user privileges are subordinated to the needs of those proposing to use the spectrum for the purpose to which it was principally allocated. There is no expectation of any repayment for costs incurred or user opportunities supplanted as a result of the licensing of a primary service spectrum user. Allowing this cost shifting in the circumstances at hand would be inconsistent with this fundamental spectrum management principle and would create a misleading and inappropriate precedent. Users in a secondary service implicity accept this risk in return for the use of spectrum that otherwise would not be available. If the spectrum they occupy is needed for its primary use, no payment or substitute spectrum is expected or required, especially from the primary user the status was designed to protect. We therefore propose not to require applicants for VHF assignments to pay for costs incurred by secondary television services.

Policy Favoring the Highest Possible Transmitter Antenna Height

135. If a licensee of a station with facilities below the maximum permitted in the Table wishes to enlarge its service area, there are two basic ways of accomplishing its goal: Increased transmitter power and increased transmitter antenna height.[138] If the licensee chooses to expand its service area by increasing its transmitter power (e.g., achieving a 6 dB increase by quadrupling its transmitter output power), for every 1 dB increase in its viewable signal there is an approximately 1 dB increase in its signal strength beyond its viewable area. In other words, using higher transmitter power to increase service area also proportionately increases potential interference caused to other stations. If the same service area increases are accomplished by increasing antenna height (e.g., a 6 dB gain by doubling antenna height) a 1 dB increase in the service area signal strength is accompanied by a much smaller increase in signal strength beyond the horizon, far from the areas where the station is viewable. Increasing antenna height increases service area primarily by increasing the radius of the station's line of sight signal coverage area rather than by increasing distant signal strength. The greater spectral efficiency of the increased antenna height approach is obvious.

136. The Commission is interested in encouraging the selection of equipment configurations that provide the most efficient possible use of the spectrum. Because of countervailing consideration such as: (1) The great cost of constructing self supporting towers; (2) restrictions on tower site availability or height because of air navigation safety considerations, or (3) the possibility of shared use of existing, but less than maximum height towers at a great cost saving, we do not believe it is desirable to propose rules defining minimum antenna heights for either new or all licensees at this time.[139] On the other

[133] *Notice of Proposed Rule Making* in BC Docket No. 78–253, note 124 *supra*.

[134] The projected cost of a low power television station will be significantly below the cost of a full service station because of its limited technical capabilities and the less demanding technical standards we are proposing for that service. Thus, for small coverage areas, low power television should be more cost effective than a full service station.

[135] Because of the § 73.614(a) requirement that VHF television stations radiate a minimum of 100 Watts in every direction and our assumption when calculating equivalent protection ratios that the LFS is operating with the maximum permitted antenna height, the minimum co-channel spacing of LFS allotments will be on the order of 100 miles. If a prospective broadcaster, who wished to serve a very small service area utilizes an LFS station two inefficiencies may result. First, he will be required to radiate a least 100 watts in every direction resulting in a service area of about 1,000 square miles; possibly much more than he wishes to serve. Second, no one else could use that VHF channel for primary services within approximately 100 miles of him, needlessly tying up more spectrum than might otherwise be the case. Thus, when small coverage areas are desired, the low power television service we will be a more spectrum efficient choice.

[136] We use "secondary" here in the technical sense of the word, meaning a user who may not cause harmful interference to primary spectrum users and must accept harmful interference from them.

[137] 63 F.C.C. 2d 480 at paragraph 206 (1977).

[138] Going to precise offset and encouraging the use of better receiver antennas and lead-in can also be options.

[139] *But Cf. Notice of Proposed Rule Making* in BC Docket No. 80–90, where the Commission placed a stricter requirement on FM radio stations by proposing rule changes that require FM radio

Footnotes continued on next page

hand we do wish to encourage the selection of the highest practicable tower whenever existing VHF television facilities are changed or new facilities proposed. By way of furthering this objective, we propose that the maximum power an LFS may radiate is to be calculated on the basis of an assumed maximum antenna height. If the applicant proposed a less than maximum antenna height, it may not increase its proposed output power to regain lost service area above the maximum allowable had the maximum antenna height been selected. As a result, only by selecting maximum antenna facilities will the licensee enjoy the largest potential viewership.

137. In addition, in situations involving competing technical proposals, such as comparative hearings between mutually exclusive applicants for the same allotment, we propose to award a comparative merit to proposals incorporating the greater spectral efficiency of higher antennas. Beyond these limited proposals, we will accept comments and solicit suggestions on regulatory mechanisms that will encourage this and similar conscious choices concerning spectrum efficiency by current and future users of the VHF television spectrum.

Substitutes for Lost Service Area

138. As discussed in paragraphs 90–93, *supra*, the radius of the Grade A and B contours of a full facility VHF television station (i.e. operating with the maximum permitted facilities several hundred miles from either co- or adjacent-channel stations) is predicted on the basis of the signal levels calculated using the FCC propagation curves.[140] The radius of a "noise limited" Grade B contour is significantly greater (e.g. 15–30 miles farther away) than the radius of an "interference limited" contour of a maximum facility station surrounded by maximum facility co-channel stations at minimum spacing. These limited contours involve the same type of statistical predictions of average signal conditions as the noise limited Grade A and B contours.

139. A television station that operates completely free of interference from all other television stations is assumed to experience a reduction in coverage from its noise limited boundary to its interference limited boundary when a maximum facility station placed at the minimum spacing from it begins operation.[141] An equal or smaller reduction of its predicted Grade B coverage is expected when an LFS that is placed at less than standard distance from it begins operation in conformity with our proposed "equivalent protection" criteria. In either case, a theoretical crescent shaped "loss" area will be created within its predicted noise limited Grade B contour but outside its predicted noise limited Grade A. Within this "loss" area an unknown number of that station's distant viewers may experience some loss in quality of service with their existing television equipment.[142] We are proposing the addition of such VHF stations despite this conclusion because we are confident that much more new television service (and local service at that) would be created as a result of the more intensive utilization of the VHF television spectrum we are proposing today. Simply stated, many people would gain service and a few would lose service. The overall public interest would be best served by introducing the new station even if some viewers suffer a reduction in service. As will be shown, in most cases the loss of service will be minor, generally would involve the loss of relatively distant signals, and in many cases may be remedied by the use of directionalized receiver antennas and precise offset.[143]

140. Highly directional receiver antennas are routinely available to consumers and are in widespread use in outlying areas.[144] If distant viewers of a station lose service because of the addition of an interfering station, in most cases a solution is available. Those with highly directional rooftop antennas can, in effect, tune their receiver system to recapture the impaired signal by either pointing the highest gain "lobe" of the antenna towards the desired station or pointing the lowest gain "null" of their antenna towards the interfering station. Those viewers with low gain rooftop antennas (or no outside antennas at all) have the option, if that lost service is sufficiently valuable to them, of purchasing better (i.e., higher gain) antenna systems and adjusting them during installation to take into account the possible interference. Furthermore, cable television service and translators are increasingly available as a means of regaining this lost service.

141. A second reason we use the term "loss" advisedly is that in some instances the predicted service "loss" is either the "loss" of service that was never available or, if previously available, will not in fact be lost as a result of the addition of a new station. If rough terrain or mountains exist between a station and an area predicted to be within the station's noise limited Grade B contour, terrain attenuation can result in a usable signal being received in a significantly smaller percentage of the locations than the present FCC curves predict. These viewers will not lose service since they never received the service in the first place. Similarly, in some instances there are mountains or rough terrain between the theoretically predicted lost viewer and the interfering signal. In these instances, service that the FCC propagation curves predict would be lost due to interference caused by the new signal will not be lost because the level of the interfering signal will be significantly below the theoretically predicted level.

142. A third reason for treating predictions of lost service with caution

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stations to have certain minimums for antenna height or be subject to reclassification to a lower class of station. BC Docket No. 80–90, 45 FR 17602 at paragraph 9 (March 19, 1980).

[140] The fact that we refer to these curves as predictions is significant. The curves are statistical averages and so cannot be relied on to predict precisely the actual presence or absence of service at a given distance from a station. Furthermore, as highlighted above in paragraphs 109–111, *supra*, the FCC propagation curves do not take into account the presence of large obstructions such as mountains or extremely rough terrain. Thus the interference limited contours and the strength of interfering signals from distant television stations may both be significantly overstated for specific situations.

In addition, these contour areas, in and of themselves, are average statistical descriptions of difficult to characterize, extremely variable parameters, signal strength and resultant picture quality at great distances from the transmitter site. By definition (*See* § 73.683) only the best 50 percent of the locations receive the prescribed signal leval (e.g. a signal strong enough to produce a TASO 3 picture or better 90 percent of the time. A TASO 3 picture is a picture of acceptable quality that displays perceptible, but not objectionable interference. This is further complicated by the included assumptions that 30 foot rooftop antennas are used, that the receiver antennas are nondirectional, that all receivers have average performance characteristics.

[141] We note that § 73.612 of the rules provide for reduction of service area and specifies that licensees are not entitled to protection from this "new interference" if the interference is "caused by the grant of a new station * * * in accordance with the provisions of the subpart of the rules." 47 CFR 73.612(a) (1978). For this reason existing stations cannot prevent the addition of a new channel to the Table on the basis of allegations that peculiar conditions will result in more than the predicted amount of interference. Any interference resulting must be tolerated. As a practical matter, the safety factors discussed, *supra*, in paragraphs 106, 109, and 117 have minimized the amount of actual harmful effects, minimizing the amount of controversy that has actually resulted.

[142] We use the term "loss" advisably for a series of reasons outlined *infra*, at paragraphs 140–145.

[143] *See* also paragraphs 106–8, *supra*.

[144] *See* paragraphs 103–108, *supra*. Outdoor television receiver antennas are available with a wide range of performance characteristics. *See Staff Report on: UHF Comparability (A Preliminary Analysis)* Philip B. Cieseler, *et al.* (September 1979) and studies cited therein. Thus, by selecting an appropriate receiving antenna the consumer could potentially "engineer" his reception system to his signal environment.

is the probable adjustment of television reception equipment characteristics to reflect the changes in the signal environment as we move from a noise limited to an interference limited television service delivery situation. In several technical respects, for example, adjacent channel interference susceptability, the performance of television receivers has not improved perceptibly in thirty years. This is true despite the introduction of several generations of improvement in other communications services that use the radio spectrum—improvement that relies on technical innovations that could be incorporated into television reception equipment e.g., solid state devices with unusually low noise figures, or highly selective tuners, or receiver antennas with significantly improved front-to-back ratios. Equipment manufacturers operate in a highly competitive environment and are responsive to market demand. The lack of improvement in such reception equipment results from the lack of market place pressure to produce equipment with superior performance of this type. That is, our rigid mileage separation rules have made efforts to improve in these areas unnecessary.[145]

143. The television reception equipment market is essentially both unregulated and extremely competitive. Few performance characteristics are presently mandated by the FCC rules as a precondition for type certification of new receiver models. No performance characteristics are presently mandated for receiver antennas or lead-ins. Since most existing television stations are spaced well beyond the standard co- and adjacent-channel spacing, a significant percentage of today's television service is noise limited (that is, limited as a result of random and atmospheric noise), rather than interference limited. As a result, there is little present consumer demand for television reception equipment with the characteristics that are suited for the interference limited environment that will result if every bit of available VHF television spectrum is utilized to its full capacity.[146]

144. The same marketplace forces that currently direct engineering energies in other directions can direct this energy towards improved television receivers and antennas if our rules changes create the appropriate incentives. As the spectrum becomes more congested, consumers will desire (and, hence demand) television receivers that are more selective and less susceptible than their 1950–1980 predecessors.[147] Superior antennas that can resolve much of the cochannel interference problems may become standard equipment. As a result, much of the theoretical service "loss" will be lost in a temporary sense only. Thus, over time, improvements in receivers and antennas should do much to reverse any degradation experienced by viewers as a result of the proposals we make today.

145. A last reason we do not believe the issue of service "loss" is of overriding concern is because we recently also proposed a source of substitute service that we believe will provide a more spectrally efficient means of serving the small population pockets that typically make up the audience out near a station's Grade B contour. The most opportunity for new VHF allotments will be outside the 10 largest cities. In these markets, urbanized areas rarely approach the 20 to 40 mile radius of a full power station's Grade A contour. Fifty to eighty miles from the station's antenna at the noise limited Grade B contour, where potential service loss could take place, most viewers live in small towns or cities that are a fraction of a mile in diameter. Currently, to provide service to these scattered population pockets, stations in the distant urban centers blanket hundreds of miles of scarcely populated land with high power signals. In the Low Power Television Notice of Proposed Rulemaking, *supra*, we are proposing a new television service that will permit the creation of small local television outlets with signal patterns tailored exactly to cover each pocket of unsatisfied television demand. Our proposal here and our Low Power Television proposal, in effect, go hand in hand. We believe that the new low power television service, together with other alternative delivery systems, future improvements in television receivers, the installation and use of directional receiver antennas, and the safeguards implicit in the FCC propagation curves and contour definitions, will overcome any actual, short term losses of present television service as a result of the rule changes we propose. When this limited amount of loss is weighed against the large amount of additional service that will result, the public interest choice is clear.

Conclusion

146. The rule changes the Commission proposes today would constitute only a small, though extremely significant, step in our procedures for identifying potential new VHF television allotments and selecting who will be assigned a license to operate on that channel. Petitioners for new allotments will continue to be scrutinized by the Broadcast Bureau's Policy and Rules Division to ensure that use of the spectrum in other communities where a demand exists is not more in the public interest. Prospective licensees would continue to be scrutinized by the Broadcast Bureau's Facilities Division, though the burden of providing a "city grade" signal over the entire community of license and the requirement that the community of license be a particular type of "community" would be significantly deemphasized. New VHF television allotments made possible by the proposed changes would be assigned to licensees who would be traditional, full fledged television broadcasters in every other sense. The Commission's rules involving technical standards, fairness and political broadcasting, public service programming, licensee qualifications, and obscenity would apply in full to these new licensees exactly as they are now applied.[148]

147. We are proposing a fundamentals change of one particular criterion for determining where VHF allotment will go. In place of a rigid system of fixed mileage separations, we are proposing to maximize the flexibility with which entrepreneurs can utilize the limited remaining VHF television spectrum capacity. We propose to employ as a

[145] The Commission has recently acted to stimulate the improvement of several television receiver characteristic by financing the development of "improved" television receivers. *Final Report for High Performance TV Receiver*, D. L. Ash and C. B. Hartmann, Texas Instruments Inc., FCC/OCE CE 78-01 (March 1978). RF Monolithics, Inc. contact to develop a prototype Improved High Performance Receiver with superior selectivity. FCC News (June 1, 1979) "FCC Issued Contract for Improved High Performance Television Receiver."

[146] *Cf. Notice of Inquiry* on *Radio Frequency Interference to Electronic Equipment*, General Docket No. 78-369, 43 FR 56062 (November 30, 1978).

[147] Even absent any changes in our VHF allotment rules, some of these improvements will be necessary in order to preserve the present level of service because the home spectrum environment is rapidly changing in many respects. With the increasing popularity of personal communication systems such as C.B's, home computers, paging devices, mobile telephone, wireless or electronic switches, and door openers, the home environment is becoming more and more crowded with potential sources of interference. This situation has already dramatically increased the number of complaints of radio frequency interference to television receivers. Commission investigations have determined that most of the problems result from the interference susceptibility of the television receiver being affected and not the improper operation of the source originating the interfering signal. This matter is under consideration in the Commission's outstanding *Notice of Inquiry* in Gen. Docket No. 78-369 released November 21, 1978.

[148] The Commission will, of course, continue its ongoing process of revising rules that have became outmoded or undesirable, but such rule changes will apply to all television broadcast licensees, whether LFS, full facility VHF or UHF station operator.

principle feature of our new rules a technical criterion long recognized and utilized by the Commission—"equivalent protection"—which will simplify the procedure by which stations are to be engineered to fit into fragments of unused spectrum too small for standard spaced allotments. This rule change, if adopted, would allow the creation of dozens of new VHF television stations in areas where there is still a stong unsatisfied demand for additional television service, utilizing spectrum capacity that would otherwise remain unused. Careful consideration of this potential for new service is clearly in the public interest.

148. In proposing this change in our station separation standards we recognize that we are reexamining a proposal that was considered and rejected by the Commission both during its deliberations that culminated in the *Sixth Report and Order* and twice since.[149] We conclude, however, that a reexamination of this question is now appropriate. Technology has changed. We now have computer programs that will calculate variable effective radiated power and protected contours in an efficient and accurate manner. Alternative video technologies are in use or on the threshold of introduction that will mitigate service losses that might be caused by the more heavy use of VHF television spectrum. And the UHF television service has matured, no longer requiring absolute protection from VHF television competition.

149. In order to maximize the flexibility of this new allotment criterion the Commission also proposes a number of related, minor rule changes. The proposals relating to a flexible definition of community, the relaxation of the "city grade" signal requirement, and the proposal to allow more directional transmitter antennas will ease the problems associated with utilization of the remaining spectrum capacity by eliminating restrictions that now prevent the addition of some possible allotments and that would be even more restricting under the proposed new allotment system.

150. Lastly, we are proposing several changes in our rules and policies that are consistent with the increased value of the spectrum resource and consistent with each licensee's status as a prospective user of a public good that is entrusted to its use without charge. The Commission proposes to change its procedures to encourage the use of certain spectrum saving techniques, such as carrier offset, precise carrier offset, sychronous carrier, higher transmitter antennas, and the freer reallotment of unutilized or underutilized spectrum to more immediate potential users.

151. Taken as a whole, these proposals may result in the most significant potential for new VHF television service since the 1952 *Sixth Report and Order*. In adition to public comment on these proposed rules, the Commission welcomes public comment on the policy changes being proposed, for example the way that we propose to allocate the cost of spectrum saving equipment. We also solicit further comment on specific proposals set out in the *Notice of Proposed Rule Making* in Docket No. 20418,[150] but not carried over as specific rule proposals here—for example, the question of how to incorporate a terrain shielding factor into our propagation curves. Possible further refinements in our allotment policies and procedures, based upon these comments, could then be considered in a further notice in this proceeding.

152. Accordingly, it is proposed to amend Part 73 of the Commission's rules and regulations as set forth in the attached Appendix.

XI. Procedural Matters

153. Interested persons desiring a VHF television allotment at a specific community that would be available only under the proposed rules should not submit a petition for rule making to amend the Table of Television Channel Allotment (Section 73.606(b)) during the comment period. Rather they should wait until a decision is made in this proceeding. Assuming positive Commission action, the request would then be made through the normal "petition" procedures (*see* Section 1.401 *et.al*).

154. Authority for the actions taken herein is contained in Section 4(i), and 303(a), (b), (c), (d), (e), (f), (g), (h), (n) and (r) of the Communications Act of 1934, *as amended*.

155. Pursuant to precedures set out in §§ 1.4, 1.415, and 1.419 of the Commission's rules and regulations, interested parties may file comments on or before December 15, 1980, and reply comments on or before February 15, 1981. All submissions by parties to this proceeding or persons acting on behalf of such parties must be made in written comments, reply comments, or other appropriate pleadings.

156. In accordance with § 1.419 of the Commission's rules and regulations, an original and five copies of all comments, reply comments, pleadings, briefs, or other documents shall be furnished the Commission. Members of the general public who wish to participate informally in the proceeding may submit one copy of their comments, specifying docket number BC 80.499.

157. All filings made in this proceeding will be available for examination by interested parties during regular business hours in the Commission's Public Reference Room at its headquarters, 1919 M Street, NW., Washington, D.C.

158. For further information concerning this proceeding contact Benjamin Perez, Federal Communications Commission, Broadcast Bureau, 1919 M Street, NW., Washington, D.C. 20554. Phone (202) 632-3861. However, members of the public should note that from the time a notice of proposed rule making is issued until the matter is no longer subject to Commission consideration or court review, *ex parte* contracts presented to the Commission in proceedings such as this one will be disclosed in the public docket file.

159. All comments, reply comment, and other matter in the record of Docket No. 20418 are hereby incorporated into the record of this proceeding.

160. An *ex parte* contact is a message (spoken or written) concerning the merits of a pending rule making other than comments officially filed at the Commission or oral presentations requested by the Commission. If a member of the public does wish to comment on the merits of this proceeding in this manner, he or she should follow the Commission's procedures governing *ex parte* contacts in informal rule making. A summary of these procedures is available from the Commission's Consumer Assistance Office, FCC, Washington, D.C. 20554. Phone (202) 632-7000.

Federal Communications Commission.[15]

William J. Tricarico,

Secretary.

APPENDIX

PART 73—RADIO BROADCAST SERVICES

It is proposed to amend Parts 73 and 1 of the Commission's rules and regulations as follows:

[149] *Sixth Report and Order* at para. 129, 41 F.C.C. at 206 (1952); *Intermin Policy on VHF Television Channel Assignments*, Docket No. 13340, 21 R.R. 1695, 1697 (1961); *Second Report on Deintermix*, in Docket No. 11532, 13 R.R. 1575-1576 (1956); *Report and Order* in Docket Nos. 14231-14238, 25 R.R. 1687, 1692 (1963).

[150] *Notice of Proposed Rule Making* in Docket No. 20418, 63 F.C.C. 2d 480 (1977).

[15] See attached statements of Chairman Ferris and Commissioners Lee, Quello and Washburn.

1. It is proposed to revise § 73.606(a) to read as follows:

§ 73.606 Table of Television Channel Allotments.

(a) *General.* The following table of allotments contains the channels alloted to the listed communities in the United States, its Territories, and possessions. Channels designated with an asterisk are allotted for use by noncommercial educational broadcast stations only. A station on a channel identified by a plus or minus mark is required to operate with the carrier frequencies offset 10 kHz above or below, respectively, the normal carrier frequencies. When a station is required by § 73.1545(c)(3) to operate with a carrier frequency tolerance of ±3 Hz in lieu of ±1,000 Hz, on a channel identified by a plus or minus mark, it shall operate with the carrier frequencies offset 10,010 Hz above or below, respectively, the normal carrer frequencies. Channels designated with an "L" are allotted for use by stations with a limited effective radiated power in the direction of a co-channel or adjacent channel station where the distance between stations is less than the standard minimum distance separation.

* * * * *

2. It is proposed to amend § 73.610 by revising the introductory clauses of (b) and (c) and by adding (b)(3) and (c)(3) to read as follows:

§ 73.610 Minimum distance separations between stations.

* * * * *

(b) Minimum co-channel allotment and station separations:

(1) * * *

(2) * * *

(3) Limited allotments may be located at communities separated by distances less than those specified in this paragraph. Stations occupying allotments which are so limited must meet the requirements of § 73.614(b)(5).

(c) Minimum allotment and station adjacent channel separations applicable to all zones:

(1) * * *

(2) * * *

(3) Limited allotments may be located at communities separated by distances less than those specified in this paragraph. Stations occupying allotments which are so limited must meet the requirements of § 73.614(b)(5).

* * * * *

3. It is proposed to revise § 73.612(b) to read as follows:

§ 73.612 Protection from interference.

* * * * *

(b) When the Commission determines that grant of an application would serve the public interest, convenience, and necessity and the instrument of authorization specifies an antenna location which results in a distance separation less than that specified in this subpart, TV broadcast station permitees and licensees shall be afforded protection from interference equivalent to the protection afforded under the minimum distance separation specified in this subpart. Such equivalent protection shall be determined in accordance with the provisions of § 73.614(b)(5).

* * * * *

4. It is proposed to add a new § 73.614(b)(5) as follows:

§ 73.614 Power and antenna height requirements.

* * * * *

(b) * * *

(5) The procedure for determing the restriction on the maximum effective radiated power of a station operating on a limited allotment shall be as follows:

(i) A straight line will be drawn between the proposed site of the new station and the site of the existing co-channel or adjacent channel station which is to be afforded protection. This line will be extended beyond the location of the proposed new station to a distance from the existing station equal to the standard minimum separation that would apply to the zone location of the actual proposed site.

(ii) A hypothetical station will be assumed to be operating at a point on this line that is at the standard minimum separation determined in subparagraph (5)(i) of this paragraph. This hypothetical station will also be assumed to have a circular radiation pattern centered on the hypothetical site and to be operating with the following parameters: Zone I, Channels 2 to 6 inclusive—100 kW ERP and 1000 ft.; Zone I, Channels 7 to 13 inclusive—316 kW ERP and 1000 ft.; Zones II and III, Channels 2 to 6 inclusive—100 kW ERP and 2000 ft.; Zones II and III, Channels 7 to 13 inclusive—316 kW ERP and 2000 ft.

(iii) Regardless of the actual power and antenna height employed by the existing station, it will be assumed to be operating with the maximum facilities for the zone in which it is located as detailed in subparagraph (5) (ii) of this paragraph, and it too will be assumed to have a perfectly circular radiation pattern center on its transmitter site. For co-channel stations, the "interference limited" contour resulting from the assumed operations will then be established as the line through all points where the estimated F(50,50) signal of the existing station is exactly 28 decibels higher than the estimated F(50,10) signal of the hypothetical station. For adjacent channel stations, the "interference limited" contour resulting from the assumed operations will then be established as the line through all points where the estimated F(50,50) signal of the existing station is exactly equal to the estimated F(50,50) signal of the hypothetical station.

(iv) If the proposed new station is located in Zone I and its proposed antenna height is less than 1,000 feet above average terrain, it will be assumed to have an antenna height above average terrain of 1,000 feet for determining its power limitation. If the proposed new station is located in Zone II or Zone III and its proposed antenna height is less than 2,000 feet above average terrain, it will be assumed to have an antenna height above average terrain of 2,000 feet for determining its power limitation. If the proposed antenna height above average terrain is greater than 1,000 feet in Zone I or 2,000 feet in Zone II or III, the actual proposed antenna height above average terrain is to be used for determining the power limitation.

(v) For co-channel stations, the proposed new station shall reduce its effective radiated power to the extent necessary so that its estimated F(50,10) signal is at least 28 decibels below the estimated F(50,50) signal of the existing station (45 decibels lower in the case of non-offset, nonsynchronous carrier operation) at any point on or within the interference limited contour of the existing station, established as set forth in subparagraph (5)(iii) of this paragraph. For adjacent channel stations, the proposed new station shall reduce its effective radiated power to the extent necessary so that its estimated F(50,50) signal is not greater than the estimated F(50,50) signal of the existing station at any point on or within the interference limited contour of the existing station, established as set forth in subparagraph (5)(iii) of this paragraph.

* * * * *

5. It is proposed to revise § 73.683(c)(4) to read as follows:

§ 73.683 Field strength contours.

* * * * *

(c) ***

(4) In determining equivalent protection using § 73.614(b)(5).

* * * * *

6. It is proposed to revise § 73.684(a) to read as follows:

§ 73.684 Prediction of coverage.

(a) Except for limited facilities stations, predictions of coverage made pursuant to this section shall be made without regard to interference and shall be made only on the basis of estimated field intensities. Limited facilities stations may include a supplemental showing of their interference limited contours to demonstrate compliance with § 73.636. The peak power of the visual signal is used making predictions of coverage.

* * * * *

7. It is proposed to revise § 73.685 (a) and (e) to read as follows:

§ 73.685 Transmitter location and antenna system.

(a) Except for stations oprating on limited assignments (See § 73.606(a), the transmitter location shall be chosen so that, on the basis of the effective radiated power and antenna height above average terrain employed, the following minimum field intensity in decibels above one microvolt per meter (dBu) will be provided over the entire principal community to be served:

Channels 2–6, 74 dBu
Channels 7–13, 77 dBu
Channels 14–83, 80 dBu

Stations operating on limited assignments are expected to serve as much of their principal community as possible, but no minimum field intensity is required.

* * * * *

(e) An antenna designed or altered to produce a noncircular radiation pattern in the horizontal plane is considered to be a directional antenna. Antennas purposely installed in such a manner as to result in the mechanical beam tilting of the major radiation lobe are included in this category. Stations operating on Channels 2–13 and stations operating on Channels 14–83 with transmitters delivering a peak visual power output of more than 1 kilowatt will not be permitted to employ a directional antenna having a ratio of maxiumm to minimum radiation in the horizontal plane in excess of 15 decibels. Stations operatng on Channels 14–83 and employing transmitters delivering a peak visual power output of 1 kilowatt or less are not limited as to the ratio of maximum to minimum radiation.

8. It is proposed to revise § 73.687(c)(1) to read as follows:

§ 73.687 Transmission system requirements.

* * * * *

(c) *Requirements applicable to both visual and aural transmitters.*

(1) Automatic means shall be provided in the visual transmitter to maintain the carrier frequency within one kilohertz of the authorized frequency; automatic means shall be provided in the aural transmitter to maintain the carrier frequency 4.5 Megahertz above the actual visual carrier frequency within ± one kilohertz. If pursuant to § 73.1545(c)(3), a carrier frequency tolerance of ± three Hertz is required, automatic means shall be provided in the visual and audio transmitter to maintain the carrier frequencies with ± three Hertz of the authorized carrier frequencies.

* * * * *

9. It is proposed to add a new § 73.1545(c)(3) as follows:

§ 73.1545 Carrier frequency departure tolerances.

* * * * *

(c) *TV stations. (1)* ***

(2) ***

(3) In a situation where two co-channel stations are causing unacceptable interference to each other, the Commission may, upon a showing of such interference by either licensee or permittee, require a visual and aural carrier frequency tolerance of ±3 Hertz in lieu of the ±1000 Hertz tolerances specified in subparagraphs (1) and (2) of this paragraph. For this purpose "unacceptable interference" is defined as occurring where the F(50,10) signal from an interfering co-channel station is less than 28 dB below the Grade B contour of the requesting station as defined by § 73.683(a).

PART 1—PRACTICE AND PROCEDURE

10. It is proposed to revise § 1.401(d) to read as follows:

§ 1.401 Petition for rule making.

* * * * *

(a) Petitions for amendment of the FM Table of Assignments (§ 73.202 of this chapter) or the Table of Television Channel Allotments (§ 73.606) shall be served by petitioner on any Commission licensee or permittee whose channel allotment would be changed by grant of the petition. Petitions for amendment of the Table of Television Channel Allotments which request a limited allotment shall be served by petitioner on any Commission licensee or permittee whose station the proposed allotment would be limited to protect (§§ 73.610(b)(3), 73.610(c)(3) and 73.614(b)(5)). The petition shall be accompanied by a certificate of service on such licensees or permittees. A draft Notice of Proposed Rule Making may be submitted with a petition for amendment of the FM Table of Assignments or Table of Television Channel Allotments.

September 18, 1980.

Separate Statement of Charles D. Ferris, Chairman

Re: VHF Drop-In Rulemaking Proposal

When the Commission unveiled the original VHF television allocation scheme in 1952, unleashing the potential of TV, it could not have predicted the choice and diversity this medium would offer. Twenty-eight years have passed, and demand to serve the public with new channels has burgeoned, not quieted.

Today's proposals would alter our method of adding new channels to the nation's VHF television table of allotments. The direct result would be to bring viewers in many markets more over-the-air television service than at present.

In many markets, all existing VHF and UHF television outlets are filled or applied for. Entrepreneurs may well find new VHF stations, even short-spaced ones, to be financially viable. In other markets competing applicants are fighting for remaining vacant UHFs. A short-spaced VHF may be the carrot to lead some of these applicants out of the costly contests for these full-power UHF stations.

Finally, there are those markets, mostly below the top 50, where still vacant and unapplied for UHF television stations remain. In these markets, decades-old dormancy of these UHF outlets may indicate that the costs of full-power UHF operation may be too high a deterent to these UHFs coming on the air in the near future. A short-spaced VHF may, contrarily, be financially viable.

Perhaps our action last week proposing cheaper, low-power UHF television operation will begin to stimulate a more efficient use of UHF channels in swollen markets, with the potential for full power UHF upgrading later. In the interim, a short-spaced VHF outlet could provide immediate additional TV service to those citizens, to be later complemented by UHF operations.

We have in no way backed away from our strong support of expanded UHF TV service. Last week's action in the low power TV field is but another in a long string of recent FCC actions to strengthen the UHF service. We have removed the barrier that there could be only one subscription TV service in a market. This action, taken last fall, has broken a longstanding log jam in competing UHF STV applications. Today's *UHF Comparability Task Force*

Report analyzes the "UHF handicap" more thoroughly than ever before and proposes new means to close the gap with VHF.

Allowing new, short-spaced VHFs could redound to the ultimate benefit of UHF television. This action could lead to creation of a fourth commercial network based on short-spaced VHFs in some markets, UHFs in others. This development could not only strengthen network-affiliated UHFs, but also attract viewers to the UHF band generally, making other UHF operations more attractive.

Programming possible with new short-spaced VHFs would not be limited to adding a fourth commercial network. Public broadcasting, primarily a UHF service, has long wished to expand its operations to VHF. The higher costs of UHF power, particularly in these times of rapidly increasing energy costs, weigh heavily on publicly-supported, non-commercial broadcasters. These broadcasters, in some major markets, may wish to switch to a short-spaced VHF and reach its basic audience at less cost, freeing the UHF channel for commercial operation. Or they could continue to operate the UHF outlet as an instructional service while using the VHF to carry the basic PBS service.

These proposals offer not only the potential for more program services for more viewers. They also offer the opportunity for new owners of television facilities. Minority entrepreneurs are benefiting by our policies stimulating transfers of existing television stations their way through favorable tax treatment for sellers and the ability of licensees designated for possible loss of license to sell out at a distress price to minority purchasers. But the process of bringing minority owners into the media could be speeded up by encouraging minority applicants to apply for these new potential TV channels.

I hope that we receive wide comment in this docket not only from existing VHF and UHF broadcasters, non-commercial and commercial, but also from individuals throughout the country as to whether they would like additional television service, and from entrepreneurs who would seek to apply for the new channels.

Dissenting Statement of Commissioner Robert E. Lee In Re: Drop-Ins to the Table of Television Allotments

The Eyes of the Beholder

I dissent. I cannot agree that this proposal is a small incremental step in the evolution of the Commission's television policy. This proposal turns past policy and precedent inside-out for the sake of a "diversity" which can be achieved easily through the allotment of UHF channels at the spacings presently prescribed in our rules.

I certainly am not opposed to diversity. That would be like being opposed to motherhood. What I object to is the use of "diversity" as the rationale for short-sighted, short-spaced VHF drop-ins. I believe that the public will get better, more diverse service in the long run if the Commission adheres to its standards for the time being and insists on full UHF development before authorizing substandard VHF channels. Otherwise, I am afraid the Commission may retard the development of the maximum possible number of television outlets.

The *Notice* does note that there are adverse consequences to the proposed drop-ins in the form of increased interference, particularly in rural areas. However, the *Notice* dismisses the problem as inconsequential because, if the affected consumers are willing to spend money, they can purchase the equipment necessary for maintaining the quality of their reception or they can seek non-broadcast alternatives.

While this tradeoff might make sense at some future time, it doesn't today when broadcast channels are still available in the UHF band. I recognize that a large number of UHF allotments are in use and that no channels listed in the Table of Allotments are available in some of the larger markets. However, consideration of available channels shouldn't end with those already listed in the Table. It should also include the potential for adding new full-spaced UHF channels. The potential is there. With a little juggling to reflect actual demand, I believe the Commission can add UHF channels to most if not all of the present television markets. The proposal here to drop-in bobtailed VHF channels when UHF channels are still available strikes me more as a vote of no-confidence for UHF than as a vote for increased diversity.

I am also concerned about the *Notice's* reliance on the equivalent protection theory as the reason why any increase in interference will be negligible if the Commission deviates from the present separation standard. According to this theory, if the drop-in can be engineered to produce the same effect on an existing station as would be produced by a full facility station located at the required minimum mileage separation, the existing station is afforded equivalent protection and the qualitative standards of the *Sixth Report and Order* can be maintained. This theory assumes that the real world result of decreasing power to compensate for a reduced mileage separation will approximate the predicted result. Unfortunately, we still do not know enough about propagation to be sure of achieving this result in most cases. To provide the parameters of equivalent protection, two factors must be evaluated. First, one must be able to evaluate the effect on an existing station if a full facility station is operated at the required minimum distance from the existing station. Then, one must determine the required power level for the short-spaced station to duplicate these effects.

Under current assignment standards, an existing station is subject to whatever interference accrues when a new full facility station is assigned at the minumum standard separation. The actual interference experienced may be more than, or less than, that which would be predicted, based on calculations utilizing the Commission's TV proportation curves. Since it is proposed that the prediction method will be used to evaluate equivalent protection, it is important to understand how results arrived at by that method may differ significantly from actual results.

The Commission's TV proportation curves have been derived by determining a best fit to a large number of measurements. The measured values, which are true indications of observed signal levels, exhibit a wide dispersion around the best fit curve. The degree of dispersion can be quantified in terms of "the standard deviation." The standard deviation identifies the dispersion limit for approximately 68% of those measured values which most nearly fit the curve. The remaining 32% of the measurements are at greater variance from the curve.

FCC Report No. R.6602, Development of VHF and UHF Propagation Curves For TV and FM Broadcasting, includes a Table showing a standard deviation of F(50,50) data as 9.0 db for low VHF, and 7.4 db for high VHF. Note is made that the relatively low values for high VHF can be attributed to the fact that nearly all of the data pertinent to the study were taken over relatively smooth terrain. It is important to recognize that the specific db levels given for the standard deviation are not of critical concern. What is important is that actual observed signal strengths are almost always different from predicted signal strengths, and the difference can be quite substantial.

To demonstrate the significance of all of this, it should be examined in the context of a real-life situation. Consider that a drop-in is to be made at low VHF in TV Zone I. This drop-in will be

assumed to be separated from an existing station by 140 miles.[1] The normal required separation is 170 miles. Under the proposed rules one would initially determine the location of the predicted interference limited Grade B contour of the existing station if a new full facility co-channel station is authorized at the standard required separation of 170 miles. If the 9 db standard deviation referenced above obtains, the location of the predicted interference limited contour can be significantly different from the location of the actual interference limited contour in a full third of the short-spaced cases which will eventually be before the Commission.

By way of illustration, the location of the interference limited contour is a function of two signals (desired and undesired) and these two signals are characteristically uncorrelated. That is, in an actual case, observed signal levels will be independently related to predicted values—one can be higher than predicted while the other can be lower than predicted. To further complicate matters, signals from two stations, when one is 30 miles more distant from an observation point (hypothetical full facility station at standard separation) than another (drop-in), will not necessarily be correlated. In these circumstances, and based on a 9 db difference between actual signal strength and predicted signal strength, the location of a predicted interference limited contour could be approximately 20 miles removed from the location of the actual interference limited contour.

At the other end of the scale, the power limit imposed on the drop-in pursuant to the proposed rules, is a function of the predicted interference limited contour. If the actual interference limited contour is 20 miles from the predicted interference limited contour, the power limit imposed on the drop-in can be off by a factor of 9 db, which, for example, can be the difference between 10 kilowatts of radiated power and 80 kilowatts of radiated power.

It follows therefore, that under the proposal, and due to the limited adequacy of available tools for predicting service and interference in specific cases, approximately one-third of the drop-in cases which may come before the Commission will be decided on terms which may be significantly unfair, either to an existing station or to the drop-in.

[1] The separation of 140 miles merely reflects the short spacing which the original OTP report suggested could be readily accommodated.

Because I do not believe that the premises for this drop-in proposal have been adequately studied or understood, I dissent. This isn't the time to give up our goal of one television service made up of both VHF and UHF channels.

Dissenting Statement of FCC Commissioner James H. Quello

In re: Notice of Proposed Rulemaking re: Table of TV Channel Allotments (Limited Facility Stations—LFS Drop-ins) September 18, 1980.

The Commission is unwisely rushing to judgement on one of the most significant and potentially disruptive proposals in FCC history.

We simply do not have sufficient information on which to base an informed, responsible decision for a Notice of Proposed Rulemaking for Limited Facilities Stations.

In an attempt to achieve some idealistic but unproven social benefits which may be predestined to failure, the majority is dismantling the landmark Sixth Report and Order which provided an orderly, responsible TV allocations process. The proposed restructuring of TV with LFS (Limited Facilities Stations) is potentially damaging to this nation's television system because of interference to existing service and the disruption and confusion to consumers. It could well result in disservice to the overall public, minorities and majorities alike, with inferior, inadequate or lost service.

This massive step should be considered only after the most thorough study and analysis developed by a comprehensive inquiry. We must know more about the *full* consequences of LFS interference with full service stations and the effect on consumers in fringe and loss areas. There is a wide variation in interference in different areas. The "equivalent protection" theory is subject to valid challenge—it seems more like a "paper" rather than practical alternative. Further, we should not rely on propagation curves for individual cases which do not adequately predict the interference levels in the real world.

We should have guidelines and specific, complete information as to what services will be affected or eliminated. We should know more about the relative stability of directional TV antennas in the VHF band. We need to know more about specific capabilities and total costs to consumers of receiving antennas which might reduce interference. We obviously need more information on effective use of terrain roughness factors in calculating propagation curves.

I particularly need considerably more information about the advantages of Limited Facilities Stations in relation to UHF stations before I can support a proposed rule. In my opinion, the staff greatly exaggerated the comparability of UHF and VHF. The proponents of this new allocations policy have conveniently concluded that there is no longer a UHF handicap and that the millennium has arrived. If this is true, I see no immediate need for LFS since there are numerous UHF allocations which are not being utilized.

Historically, soon after the Commission first decided that VHF and UHF stations could co-exist within the same markets, it became obvious that the decision was based on inadequate information. Many UHF stations were constructed in the 50's only to go dark within a short time because they were unable to compete. Now that UHF is finally showing signs of progress, the majority is, in effect, adding new impediments to its further growth by proposing nationwide VHF drop-ins.

Also, if UHF is now fully comparable to VHF, it certainly isn't appreciated in New Jersey or Delaware, two states with justifiable complaints about no full VHF–TV service. I welcome even the promise of VHF service to New Jersey. However, it is doubtful if petitioners for full VHF service would be satisfied with low power drop-ins of LFS.

If substantial VHF service is really technically feasible for New Jersey, we should promptly provide that needed service without awaiting the outcome of this proceeding. Last October, the Commission was informed by our staff that there was "no possible way" to provide VHF service in New Jersey or Delaware. Since I am not aware that the laws of physics have been amended, I hope the technical judgments made today are superior to those made last October and that finally we can overcome this serious problem. If feasible, we should provide VHF service authorizations to New Jersey and Delaware on a special basis without awaiting the outcome of this rulemaking. The needs of these two states are obvious and unique and should be accorded specific, immediate attention without requiring a nationwide Limited Facilities Service allocation.

Overall, I can't understand why it is so imperative to restructure the entire television industry in September 1980 instead of adopting a more reflective, responsible approach based upon more complete knowledge and analysis.

I believe a matter of this significance and impact should receive the guidance and approval of Congress, not an "arm of Congress." It should be determined on

a higher level by elected officials directly responsible to the American people—by the Congress and not by appointees to regulatory agencies. I have a nagging concern the majority is rushing into a course of action that may have a negative, disruptive impact on our quality of service and on the entire American TV system—a system that with all its flaws and human errors is still the most informative, creative and diversified in the world.

Dissenting Statement of Commissioner Abbott Washburn

Notice of Proposed Rulemaking re: Table of Television Channel Allotments

Adverse Impact on UHF

The executive Summary of the Report of the Comparability Task Force (approved by the Commission on September 18, 1980) speaks of the goal of "a fully competitive and prosperous UHF service". Its closing sentence reads "* * * this goal is now beginning to be achieved * * *"

In direct contrast, this Notice on page 29 states "* * * UHF is now sufficiently mature and viable to compete directly against VHF * * *"

The first statement is the correct one. UHF has begun to turn the corner. It should not now be subjected to additional hazards. Many UHF stations are still marginal. UHF channels remain available to be applied for and to be activated.

This rulemaking, in proposing to do away with the minimum mileage separations and substituting so-called "equivalent protection", is an abrupt reversal of the Commission's long-standing policy of bending every effort to assist the development of UHF. With the issuance of this proposed rulemaking, the continued healthy growth of UHF will be stifled. Entrepreneurs will prefer to opt for the short-spaced "V's". In my judgment we should not now propose such a drastic change of direction.

"Equivalent Protection" Approach Seriously Flawed

The Notice states that "the proposed approach will eliminate much of the uncertainty* * * of the current procedure." In point of fact the opposite will be the case. In place of today's clear-cut mileage separations, the "flexible criteria" here proposed will lead to greater uncertainty. There will be costly arguments in television markets throughout the country as to whether or not specific applications for short-spaced VHF stations will provide the required "equivalent protection". Engineers and lawyers will reap a harvest contesting and defending these applications. Rather than shortening the process, the proceedings resulting from this approach will be as long or longer than those we now have.

Adding to the disruption and uncertainty is the definition of "equivalent protection". The use of the F(50, 50) and the F(50, 10) curves to define "equivalent protection" in specific instances is a misapplication of the engineering principle underlying the derivation of these curves. In paragraph 91, on page 43, the authors of the Notice recognize this:

> These curves were derived from many measurements on different stations under varying conditions and therefore represent average values; they are intended for allocation purposes and general studies and *will likely prove inaccurate in individual cases that deviate significantly from the norm.* (Emphasis added.)

Statistically, 68% of the data points will fall within plus or minus 9 dB of the interference curve. 32% of them will fall more than 9 dB outside of the curve. Thus, in almost one third of the cases the use of the curve to allot a channel produces an unrealistic and unfair result: Either penalizing the drop-in station by imposing a power limit that is too low to enable it to serve its market, or allowing too high a power level causing serious interference to the existing station. (In the latter case an exceedingly heavy burden-of-proof rests on the existing station.) The curves, therefore, are neither a fair nor a workable tool. To attempt to so use them can only cause uncertainty and contention.

It is like taking a mean January temperature for 100 U.S. cities of 50° and concluding from this that motorists in Detroit, Duluth and Cheyenne won't need snow tires and chains next winter.

In addition to the unsound use of the curves to predict service or interference in specific situations, the Notice relegates several significant elements to the status of mere "safety factors". For example, in paragraph 104 on page 56 *receiving antenna directivity* is not incorporated into the "equivalent protection" criteria.* Likewise in paragraph 111, page 60, *terrain shielding* is relegated to an additional "safety factor" and does not enter into the protection standard. These considerations are of over-riding importance in specific drop-in situations and should be factored into the allotment methodology as such.

A More Accurate Recommended Procedure

In any specific case there are three possible types of propagation paths from the interfering transmitter to the protected receiver. Each of these three paths has distinct characteristics. However, in the derivation of the FCC curves they have necessarily been averaged, which explains the wide variability associated with those curves. The three categories of propagation paths are:

1. Line of sight between the transmitter and the receiver, normally limited to relatively short paths (less than 50–60 miles).

2. Paths with one obstacle where the transmitter and receiver essentially share the same horizon. These paths are normally of an intermediate distance, and in some of the short-spaced stations envisioned here this type of path applies. These one-obstacle paths can either offer shielding or they can result in significant gain over the average values depicted in the FCC curves. Where these paths exhibit gain they are known as knife-edge diffraction paths and this phenomenon was originally described by Bullington.* The situation where the knife-edge diffraction results in significant gain can occur in as many as three-quarters of a random sample of one-obstacle paths. Furthermore, these knife-edge diffraction paths exhibit a greater stability over time than do other propagation paths. Where this type of transmission is present it would seem risky to rely on the FCC curves alone.

3. Two-obstacle paths exhibit no such gain but only shielding effects. These paths generally occur at greater distances and usually obtain under the present rules where minimum distance separations of 170 miles or more are required.

Additionally, there are certain cases where there is very flat terrain between the interfering transmitter and the protected receiver where the terrain roughness factor described in the FCC rules is slightly positive. Today's Notice of Proposed Rulemaking attempts to treat terrain solely as a "safety factor". This is appropriate only insofar as terrain provides attenuation or shielding. It is not appropriate to consider it solely as a "safety factor" if the terrain shielding factor is positive nor is it appropriate to disregard knife-

* Notwithstanding the uncertainties highlighted in paragraph 105, page 56, front-to-back ratios of "typical" home rooftop antennas ar required to be added to the near impossible showing under the *Carroll* doctrine (see footnote 72 page 31) by those who file in opposition to the drop-in.

* K. Bullington, "Radio Propagation Fundamentals," Bell System Technical Journal, vol. 36, no. 3, Fig. 7, AT&T.

edge diffraction gain in those single-obstacle paths where it applies.

While I would prefer that each drop-in proposal be supported by its own unique measured data and calculations, I recognize that such a policy might be unduly cumbersome and expensive for the applicant and the Commission. However, I find that the variability in the simplistic use of the average FCC curves, as proposed, entails too much risk of significant interference. Accordingly I would suggest that, as a mimimum, consideration be given to augmenting the use of curves by having the drop-in applicant furnish appropriate path profiles and some minimum amount of measured data. It has been estimated that very minimal supplementary measurements** would reduce the variability in the FCC curves from 9 or 10 dB without measurements to around 4 to 6 dB.

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** For a fuller explanation of how to obtain improved prediction by measurements, see National Bureau of Standards Technical Note No. 102, August 1961.